On cancer of the breast / by Thomas William Nunn.

CANCER OF THE BREAST.

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WITH COLOURED ILLUSTRATIONS.

BY

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THE RIGHT HONOURABLE

VISCOUNT TORRINGTON, D.C.L.

WITH GRATITUDE AND RESPECT.

PREFACE.

THIS Essay is divided into two parts:—The first, Clinical and Practical; the second, Pathological and Speculative. It is intended to give a report of what I have observed in the wards of the Hospital, and of what is revealed in the *post-mortem* room, and to afford Pathological data to enable the reader to weigh the value of opposing theories as to the nature of the disease. In some few instances private cases and cases published by other surgeons have been quoted in illustration where it seemed to be advantageous.

With regard to the Pathological Division, the microscopical drawings by Mr. Berjeau have been made from sections prepared for me by Mr. A. Cole from recent specimens. The sections were cut and the drawings executed without bias towards any particular theory.

An abstract from the discussion at the Pathological Society is also appended. It is only necessary to point to that discussion to show how unsatisfactory the present state of our knowledge is. There is a want of well-ascertained facts; and the opportunity of contributing facts of great interest in relation to Cancer must fall to almost every practitioner.

Statistical details, generally, have been derived from the registers and my case-books of patients at the Middlesex Hospital.

I have to acknowledge my indebtedness to my former colleague, Dr. W. Woodham Webb, in matters pertaining to general anatomy and histology, and also to my friend Mr. Ed. Vaillant, for much other assistance.

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INTRODUCTION.

AT all stages of its growth Cancer has certain typical conditions which vary according to its position, the tissues which it replaces or among which it grows, and the course of development which it follows. All that can safely be done in the present state of our knowledge of the morbid anatomy of this disease, is to describe what shows itself to the view of the surgeon and to the eye of the microscopist. The forms of the disease are so varied, and so intermix, that a series of descriptive lines must needs converge and interlace. Everything in cancer is apparently so much out of order that definition must stop short at its elements, and its description can only be an account of the confused arrangement of disorderly component parts and the imperfect attempts at imitative formations. Essentially it is an ineffectual effort of development which ends in the production of tissue-monstrosities. There are in cancer no new elements, and the deformed results of the morbid growth from natural points of origin, are but divergences of normal tissue, some by exaggeration, some by defect, some by malposition, some by eccentric combination. Nothing is regular or determined; and if there be order in this disorder, we have not yet discovered its laws or untangled its intricacies. All who have attempted to define, to describe, or to classify cancers, have either laboured under the disadvantage of supposing that they knew a great deal about it, and have distributed the facts before them, and explained them in accordance with some theory which they have not pushed on to a demon-

stration of its fallacy, or they have stopped short and contented themselves with a sort of conventional account of various forms which they hold up to view.

With the theorist everything is either an epithelial cell, or a connective tissue-cell, or a specific cancer-cell; the pathological demonstrator gives nothing more than a catalogue of genera and species which are to be regarded as so many malignant entities. But the latest research has not carried us much further. If we know more, we do not understand much more, and theoretical speculations have more or less clouded over and obscured the ascertained facts. More has to be done before we hit upon the clue to the explanation of what is seen; and what investigators have now to do is not to try to disentangle the complicated web of the fully-formed disease, but to find out and follow the points of origin, the lines of divergence from natural growth and function, and the interweavings and crossings of debased formations which make up the recognized shapes and conditions of the diseased structures. We know that the end of cancer is a gangrenous sloughing or a slow atrophy; we know the intermediate stages, varied as regards vascularity and coherence; the question is, how does it begin?

We have then to deal, first, with a proposition—This is a cancer, and to describe what is accepted as such in its various forms; secondly, with a problem,—What is a cancer? and to show how much or how little we know about the matter, and to seek for an explanation of what we do know.

Very little importance can be attached to the elaborate classifications of cancers on which so much ingenuity and labour have been spent. The long bibliography of this century, from the time of Hunter, G. L. Bayle, Andral, and Cruveilhier, down to the last brochure of the Parisian school, contains a medley of supposed practical and scientific groupings of the tumours, and little that is really useful.

The great bulk of writers on cancer have busied themselves in finding out differences in the several growths which they called cancer, whereas it seems more rational, considering the uniformity of

origin and type in the tissues of which they are morbid conditions, to endeavour to discover resemblances and the stages by which they merge one into another and form a reverse sequence of retrograde changes. We follow development in its upward progress from the initial cell through the appearances of embryonic connective tissue, alveolar tissue with its expansion into fat, plain, fibrous tissue with inorganic muscle, striped fibrous tissue changing insensibly into striped muscle; while on the other side we have striped muscle ending in plain fibrous tissue, and that again assuming by degrees the character of cartilage, and cartilage becoming ossified. Intermixed with all we get nerve and vessel-structures and compound organs and glands, all of which are no more than complex arrangements of the same tissues made up of the same elements. The whole natural growth is on an ascending scale, and as the product is not enduring, the process of decay and replacement has a corresponding uniformity.

The growth of cancer if not orderly and consecutive, starts from the same points and tends, though imperfectly and confusedly, to the production of the same tissues and combinations, even to the formation of vessels and pseudo-glandular organs. But the formative power being insufficient and ill-directed, the result is a mixture of imperfect and deformed cells, tending to reproduce themselves instead of developing into tissues; and where tissues, more or less normal, do appear, their arrangement is irregular, and their combinations little more than monstrosities.

We know that there are so many organs in the body, and the whole is made up of so many combinations of various tissues. Cancer may appear in any one of them separately, or may invade several of them simultaneously; it may simulate, disguise, or exaggerate their forms; and I am inclined rather to regard it as a modification of the part where I find it, than as a something extraneous.

The starting-point of the whole organization is a prolific unit. Its progeny assume a given number of normal transformations. At a certain stage of maturity, or after a certain time of vital activity, these have a tendency to retrograde changes, or, under conditions, to

reassume simpler forms. By accident, or from the influence of some unknown causes, these multiplied units, of which every tissue is composed, are subject to deformities and molecular deterioration. And it seems most natural to regard cancer as an intensification of this abnormal development and retrograde change, and to describe it, wherever found, as a series of deviations from the natural form and composition of the existing tissues.

But how is it that all these conditions of cancer, presenting so many diverse appearances, can be shown to be essentially the same? Simply by histological examination. Deaths and operations give us the opportunity of investigating the minute structure of these tumours in all stages of their growth, and the result is a tolerably exact knowledge of the nature and disposition of their constituent parts and elements. By sections made after due preparation, we find them all to consist of countless multitudes of cells, for the most part having great activity of reproduction and very little developmental power; pushing their way among the ultimate elementary parts of tissues and organs, and there undergoing their abortive changes, or accumulating in groups among the meshes and alveolar spaces formed by the interlacing of the fibres and bands of fibres of a more or less perfectly-formed kind of connective or fibrous tissue. Lymphatic action and the circulation of blood is carried on among these growths by a modified capillary arrangement; and the grouping of cells, stroma, and vessels presents to us simulacra of the organs, or imperfect imitations of the tissues among which they are found. In other words, we may describe cancer as the formation of cell-growths amongst the textural elements of a part, such cell-growth being of low vitality and short-lived. This cell-growth, so inherently prone to atrophy, either gives rise to atrophic changes in the textures in which it is generated, or, acting as a stimulant, induces a vascular outgrowth. Accordingly, there occurs either a slow wasting and shrivelling of the parts or a vascular hypertrophy, with great tendency to inflammatory action, which rapidly runs into gangrene—a gangrene which destroys *en masse*, as well as by the molecule.

First, then, as to the cells, it is necessary to state that there is no such thing as a specific cancer-cell *in respect of form*. When Lebert in his "Traité pratique des Maladies Cancéreuses," first announced his supposed discovery of such distinctive cells, it was thought to be a happy event in the history of surgical diagnosis, and an easy means of giving an answer to the anxious inquiry of a patient: "Is this a cancer?" But notwithstanding all his ardour for science and his indefatigable activity of research, and notwithstanding the enthusiasm of the early adherents to his views, it soon became apparent that he had fallen into error. It was then the early days of histological observation. The knowledge of what was normal was restricted, and he himself confined his examinations too exclusively to what was then called the cancer juice. Other men, widening their field of inquiry, soon discovered that cells identical in forms and characters were to be found elsewhere than in cancer, that, in fact, they existed in other tumours not cancerous,—in natural structures and healthy states.

The reaction was almost complete, and though we even now perhaps too often meet with the recurrence of the term cancer-cells in discussions upon the subject, there are few who really believe in them, and the words either escape by inadvertence, or are used in a general sense. The organism does not produce, even in disease, elements which are foreign to its physiological condition. They may be subject to deformities, aberrations of arrangement, excess or deficiency of production, or development at unusual periods of existence, but the cell of the species remains always the same. The cells to which cancer owes its origin, which make up its bulk and substance, which are found in the fluids discharged from it, and which in perishing give it its repulsive physiognomy, are only the derivatives or analogues of precedent cells existing in a state of nature. And whatever may be the enormities resulting from their morbid growth and combination, and whatever transfigurations they may unfold in their eccentric career, we must always revert to the fact that their elements are but the deformed descendants of some originally healthy cell, forming part of the tissue

or organ in which they have usurped a place, and which they tend to destroy.

A normal cell may give rise to a caudate or otherwise deformed cell—the cancer cell of Lebert—in the same way that the human mother may bring to birth an acephalous or otherwise monstrous child, but not anything specifically different from herself.

In a collection of cells from different parts of a cancer-growth, or from a series of cases, we shall be able to pick out the forms and conditions of cells which best give us a notion of what constitutes the tumour. There will be seen some agreeing in all respects with the description given of the perfect, normal cell,—a simple nodule of organic matter,—or small roundish bladdery bodies made up of a thin pellicle of transparent matter, without visible openings, but absorbent, and permitting the passage of fluids, having within them unorganized contents, more or less clear and liquid, and sometimes imbedded in the membrane, sometimes attached to its inner surface another smaller vesicle,—the nucleus, in which, or upon which, lies a third minute globule,—the nucleolus. When floating free in fluid the round form seems as natural to these cells as to the ovum, and is perfectly shown under the binocular microscope, but with bodies so delicate, the slightest contact distorts, and the round assumes any of the other shapes which a compressible ball would under pressure. Then there are other cells with the same structure and contents, of which the membrane has become distorted, has bulged on one side and contracted on another, with the contracted part ending in a point. These are the so-called caudate cells, which, when flattened out, have very much the look of a battledore.

Some, again, have more projections of the membrane, and are irregularly stellate. Others are fusiform, polygonal, conical, irregularly-flattened, constricted, and indentated. Mixed with these we have a number of epithelial cells, pavemented and cylindrical, changed but recognizable; cells containing pigmentary matter, varying in colour from pale yellow to black, and some with traces of oil, or filled with oil; large, soft, almost jelly-like, many-nucleated breeding-cells, called myeloid and colloid; and the stellated form of cell with long mem-

branous prolongations running out into anastomosing fibres, and showing the formation of tissue corresponding with that of early embryonic growths, also present themselves. Then there are everywhere scattered about, or in groups, the multitudinous derivatives of these various cells, little spherical masses of protoplasm from $\frac{1}{1800}$ to $\frac{1}{3000}$ of an inch in diameter, indistinctly nucleated, which are described sometimes as escaped nuclei, sometimes as granulation-cells, or "indifferent," but which seem rather to have the characteristics and powers of spores. The most remarkable of these are their extreme pliability, their rapidity of development and reproduction, and their capability of spontaneous movement. Though apparently the most insignificant among the products of cancerous scrapings, they really are the most important objects of study, as it is to them we may refer the continuous growth and distant propagation of the disease.

In looking over these various forms of cell, we find them in almost every possible stage of growth, function, and decay. With some, there is seen the process of gemmation and constriction, announcing their immediate division. Nuclei, in others, are separating into two, and the line of a transverse partition is visible across the cell-space. Mother-cells, again, are nearly filled with a young brood ready to escape, and elsewhere the protoplasm agglomerates into the spore-like corpuscles. Such a cell is in the state called by Virchow and Klein vacuolation, and is nearly at the end of its career. The nucleus has become obscured in the cell-wall, oil globules have formed in the void left by the contracting protoplasm, which has resolved itself into a cluster of young endogenous cells or spores. Sometimes the contents are granular, and have fatty matter mingled with them, and the cell-wall is evidently in course of decay. Floating in the fluid among all these cell-structures, there is the debris of such as have already perished, or been mutilated in the manipulation, with occasional fragments of the tissues to which they belonged, and a few blood-corpuscles that have accidentally escaped from the torn vessels.

But there are other constituents in these tumours besides cells.

Free cells which escape from a section, or cells in groups, held together by some intercellular medium, will not suffice to make up a consistent tumour. They must have nutriment; and as it is with the body at large, so it is with them. Thus, nutrition implies change, and the throwing off of effete matter. We look, then, for afferent and efferent channels, blood-vessels, and lymphatics. However simple a tumour may be at its origin—and there is no way of shirking the physiological obligation that every tumour must be logically followed back to its first transgressing cell,—it does not long remain so. One can fancy the taint which gives its character to the morbid mass which we call cancer, confined to a single cell. It matters not whether that individual cell be native or imported. At the moment of its taking on the vicious action, it may be either an amœba-like sporule, or a co-operating constituent of some tissue, or an agent in the function of some gland. In either case we can understand its corrupting influence. It may throw off a brood of descendants, with all sorts of abnormal tendencies in their development, which, attaching themselves in one direction, or usurping the place of healthy neighbours in another, spread the mischief. Or it may by mere contact throw the work of the part out of gear, spoil the function in which it ought to have assisted, or set up some eccentricity of growth. That growth goes on malformed and inefficient for healthy purposes. Cell produces cells, and cells make up tissues such as they are. And what they are, out of place, out of form, and out of order, they are made by some transmitted malign influence. Certain cells, or herds of cells, keeping up and perhaps redoubling the hereditary vice, surround themselves with bands, or get penned up in the meshes of bundles of fibres unnaturally distributed and badly nourished, and there they grow as interloping nodules, or pulpy excrescences, among healthy tissues, upon which, sooner or later, they impress their own debased characteristics.

Huxley ("Anatomy of Invertebrated Animals," article Morphology, p. 12) says of cells: "All that is at present known tends to the conclusion that in the complex aggregates of such units of which all the

higher animals and plants consist, no cell has arisen otherwise than by becoming separated from the protoplasm of a pre-existing cell. * * * As a general truth, applicable to nucleated cells, the nucleus rarely undergoes any considerable modification, the structures characteristic of the tissues being formed at the expense of the more superficial protoplasm, and when nucleated cells divide, the division of the nucleus, as a rule, precedes that of the whole cell."

Now, if we regard all these fibres and combinations of fibres as derivatives of connective tissue-cells, knowing what connective tissue itself may diverge into, we shall find no difficulty in accounting to ourselves for the dense structure of some of these morbid investments, the open, loose dispersion of the fibres in others, and the almost filamentous or membranous condition of those in the brain-like or gelatinous outgrowths. And if it be objected that the morbid action sometimes demonstrably commences in epithelial cells, the difficulty dissipates at once when put face to face with two considerations. First, that epithelial cells, supposing them to be the first offenders, may impose their own evil influence upon all other kinds of cells. For, admitting an inherent difference between endermic and epidermic cells, there is no known antagonism in their action, and no known preservative against their reciprocal action. On the contrary, they form a generative alliance in the impregnated ovum, and they co-operate everywhere in glandular function. Why, then, should they strike at the cancer point? One may infect the other, and draw it out of its natural course. Secondly, that epithelium in certain forms, or call it endothelium, is a product of connective tissue-germs. What lines the sheaths of tendons? Create a bursa, and what is there on the opposing surfaces of the sac? Epithelium, or its congener, is nothing alien to connective tissue; and even if it could be proved that epithelium is necessary to the growth of cancer, we need not go to the outside of the organism to seek it.

The various forms of stroma are then all to be treated as essentially identical in their nature, and only as modifications

of each other in arrangement of tissues derived from the same element, more or less perfectly formed, more or less perfectly nourished.

In what is called scirrhus the fibrous stroma is in dense bands and layers crossing and fusing into each other, so as to leave spaces and loculi. If quite empty and freed from the cells which lodge in the spaces, it would have much the appearance of light dough, while we may form an idea of what it is in the looser forms of cancer by looking at the distended areolar tissue inflated with air. The scale of course is different, but the microscope helps us in this matter. The bands and layers of the stroma are made up of bundles of elongated fibre intermixed with blood-vessels and lymphatics. The individual cellular fibres vary in appearance according to the stage of their development and the circumstances under which they are placed: when young, the form is a long oval terminating in points; sometimes they are so stretched out as to look very like the fibres of cotton, and under strong pressure become flattened and almost blended with each other. The nuclei are rendered visible by re-agents and show the infinite number of fibres making up a layer; and intermixed, especially towards the edges of the bundles, the indications of connective tissue-formation appear with isolated cells, and lines or groups of cells, expanding out into the form of membrane. In the closer kinds of stroma the vascularity is not abundant, but in some others vessels predominate, and injected specimens would almost lead one to suppose that there was but little space left for anything else, so close is the disposition of the capillaries and so numerous are the anastomoses. In fact, they often ramify in the intercellular spaces and spread out on the surface of the alveoli, in some cases throwing out a sort of varicose tufts. The intimate relation of the lymphatics to these vessels and their communications with the alveoli cannot be disputed. Lymphatic spaces were pointed out by MM. Cornil and Ranvier, and more recently have been examined by Dr. Hoggan and Mrs. Dr. Hoggan. In a word, taking cancers as a whole, there would be no difficulty in showing in the various stromas

every variety of connective tissue-formation, from the most embryonic granular to the fully ossified.

Hitherto I have only spoken of cancer in relation to connective tissue, because this tissue is the primitive fundamental source of all others. For, again, carry the mind back to the early stages of organization. After the era of pure cells in the fecundated ovum, we get the age of embryonic connective tissue. It is alone and supreme. Neither blood, flesh, nerve, nor bone overshadows its regal unity. It is the forerunner of everything else, and it has its moment of undisputed possession and domination. But in the natural course of development its reign is short. Blood-corpuscles come into existence, use their power of moving about, squeeze themselves through interstices or tunnel for themselves routes in the plastic matter, which sometimes remain as permanent channels. Under this new stimulus, differentiation into the beginnings of tissues takes place, and the granular indistinct foundations are laid for the formation of glands. Development proceeds, tissues and organic characters are assumed and may be identified. The time is not long, and the genealogy of tissues is not as yet obscured, however marvellous the transfiguration. From cell to muscle and bone the stages are short and well marked.* It is more easy to trace them upwards in this way and accept the facts, than to analyze and disintegrate and recognize the elements in old, masked, and distorted structures which have done their life-long duty. But age does not destroy affinities and identity, nor change the laws of growth in the economy. What man was in the beginning he remains to the end. If in maturity he throws out organized products in excess, it is a local recommencement of embryonic phenomena, generally without a well-directed formative impulse, and we get but the semblances of things natural. So it is with cancer. It attacks everything, though with preferences,—glands,

* "Thus muscle becomes tendon by growth of its sheath at the expense of the muscle replaced by tendon, and in the same way tendon may be replaced by bone. Therefore there is evidence to show that the different structures of the body have a functional origin."—Professor H. G. Seely, "Lectures on Evolution."

muscles, bones, intermediate tissue. It changes what it finds formed, and it stimulates to new productions, imitating the old, but falling short of perfect repetition.

Thus, in examining a wide range of cancer tumours, we scarcely miss a single type of formation. In one, separately we identify the cells as epithelial cells; but there are too many of them. Their developmental activity has outstripped the functional necessity. They embarrass the action of what is adjacent to them, and in time they stop mechanically their own supply of nutriment. They soften, decay, and slough; that is, they die. If all died at once, the disease would be at an end, self-cured. But unfortunately, except in rare examples, the death of part gives liberty and the occasion of growth, and the mischief goes on by repetitions and extensions of its area. Tissues and neighbouring glands become involved, the capillary and other circulating channels participate in the change of form, distribution, and size, and the result is the confused medley of sprouting epithelioma. In the case in view for portraiture, the sebaceous and sudoriferous glands and hair-follicles are implicated in the disease, as well as the epidermis. The ducts are blocked with pavement epithelium, slightly adherent, and, when separately examined, the cells are found to be granulated, irregular in shape, and dentated at the edges.

In another section we have a fragile substance which might truly be called a mass of embryonic tissue, a sort of gelatinous mucus-yielding matter, contained in a delicate mesh-work of anastomosing cells traversed by many capillary vessels, and usually known as myxoma. The cells are often indistinct in form, but for the most part are stellated with connecting prolongations. Others are isolated and round. In all, the nuclei are readily distinguished. The growth is rapid, and it is not surprising that a number of amœboid cells show themselves among the others, and in the viscid matter which fills up all the interstices of the slight tissue. This formation is found in the rapidly-growing parts of cancerous tumours, especially when they are involving the areolar tissues.

With the developmental tendency inherent in this form of tissue, we have not far to search before finding that some of the cells have appropriated to themselves special contents in the form of oil. These are often single and scattered about among the others, but groups take on the same action, and form fatty masses. The cell-wall has generally the appearance of being more thickened if this happens, but the endogenous reproduction is not checked; and when the contents are cleared away the dividing nuclei are easily brought into view. There is in this no new growth; some of the cells which made up the trabecular structure of the myxoma have filled themselves with oil, and in doing so have mechanically displaced the intercellular gelatinous matter which originally separated them. Artificial injection shows that these fat-filled cells are almost always encircled by a loop of capillary vessels; but, under the rapid modifications of nutrition to which these structures are subject, they quickly disappear, and instead of them we find a more or less fibrous residue, which gives greater firmness to the spots thus changed. A fatty tumour, or a fatty excrescence on another tumour, would soon be the result of this particular development.

But suppose the change to be rather a chemical one than a change of formative character, the cells act and fill themselves with a substance which is neither oil nor mucus, but something differing chemically from the intercellular substance of myxoma, in that it contains sulphur and gives no precipitate with acetic acid. The nuclei are displaced, the cells are over-distended, die as cells, and the contents coalesce into colloid masses, which form, by pressure, cyst-like cavities in the intercellular tissue. Under such circumstances the nutrition is very imperfect, the walls of the alveoli are thin and feeble, and the contents are subject to changes which indefinitely modify their appearance and chemical constitution.

Not unfrequently black pigment-matter is found mixed with these mucoid and albuminoid collections, and in some cases the cells of the tissue not only contain pigment-matter but it accumulates in masses in the interstices, and forms in fact the chief part of the

tumour. In the advanced stages of this melanotic degeneration the pigment becomes granular and mixed with hæmatoid crystals, the last and permanent condition of the transformed matter.

It is very questionable whether there is any essential difference in these forms of modified embryonic tissue. It is true they may be found sometimes separately in great abundance, and forming the whole of large tumours, but they may equally be seen side by side, or intermixed, in another tumour, gradually fusing into each other, and each contributing its share in the building up of the whole mass of disease. The reproductive power is strong and the increase is rapid, but the tendency to develop into some higher type of structure is absent. If it had vitality enough to live, it would live as we see it. The force, however, is insufficient, and, instead of living, local death is the result, and that which replaces the dead is no stronger than its predecessor. The existence of these fragile tumours depends on their reproductive power.

Under other circumstances we find just the contrary tendency. The tumours increase slowly. The formative power is more marked than the power of reproduction. That which in its beginning was the same embryonic tissue, soft, yielding, ever changing the form of its component cells and giving way to mechanical pressure, and submitting easily to the chemical influence of the fluids brought to it, takes a more definite form and becomes fibre. These fibres may accumulate in great quantities. From the same elements vessels and lymphatics take their origin, and, thus organized, we may have the vast accumulations which offer themselves to our notice as fibrous tumours. If, however, the fibre-formation is imperfect, the cells becoming spindle-shaped only, or even remaining ovoid, with the reproductive power and the formative power pretty equally balanced, the various forms of sarcomata are the result ; and these sarcomatous tumours, according to the morbid impulse given to them, may become either melanotic, pigmented, or comparatively passive in their degeneration; or they may with an exaggerated vascularity, increase rapidly in size with the deposition of

the "brain-like" matter characterising the growth known as encephaloid. But if in the course of their development these nascent fibres meet with nodules of aggregated cells, they spread out over them, form bundles which interlace with each other, and with the vessels and lymphatics, make up the complicated alveolar meshwork which is the base and typical characteristic of the various forms of scirrhus. And this in its turn may, from its comparatively high standpoint of development, give way to various influences and submit to all the series of degenerations common to morbid products, and either show tissue-decay and death in its various forms, or, in a few happy instances, may, from the action of some benign restorative power, disappear altogether from the organism.

CANCER OF THE BREAST.

PART I.—*CLINICAL AND PRACTICAL.*

PRECEDENCE has been given to the Clinical History of the disease, over the consideration of the Pathological details, as being the most natural arrangement of the two chief divisions of the subject.

FREQUENCY.—A leading and prominent clinical fact is that amongst those who suffer from cancer—cases of cancer of the breast and uterus are found with a predominating frequency.

In 268 *consecutive* cases of cancer noted by myself in the Out-patient Cancer Department of the Middlesex Hospital, there were 157 cases of cancer of the breast, and 47 of the uterus. The cases of cancer of the breast to cancer of the uterus were thus more than three to one. The complete analysis is as follows :—

Breast	157	Abdomen	1
Uterus	47	Rectum	3
Head	2	Scrotum	3
Face	24	Penis	1
Tongue	15	Pudenda	1
Throat	3	Groin	1
Sternum	1	Leg	2
Axillary Glands (primary)	4	Foot	1

But the observation of a thousand (1,000) cases taken from the register of the In-patient Cancer Department of the Middlesex Hospital* shows a different proportion. The numbers were: 260

* These cases, it should be stated, are of date subsequent to that of Mr. Sibley's paper quoted below.

cancers of the breast, 389 of the uterus.* The complete analysis is as follows :—

Breast	260	Rectum	42
Uterus	389	Penis, Scrotum, and Testes	24
Lymphatic Glands	21	Ovary	1
Head and Face	48	Vulva, Vagina, and Bladder	17
Mouth and Lips	48	Bones	29
Eye and Orbit	12	Skin and Cicatrix	8
Nose	2	Brain and Nerves	1
Tongue and Parotid Gland	62	Organs of Thorax	1
Pharynx and Larynx	7	Organs of Abdomen	4
Arm and Hand	7	Leg and Foot	17

Mason Warren in his table of "Operations for Cancer," reports 154 cases of cancer, 59 of which were of the breast.†

Mr. Sibley gives a total of 520 cases, 192 were cases of the breast, 156 of the uterus.‡

Mr. W. Morant Baker, from notes taken by Sir James Paget of 500 cases, uterine cancer being excluded, found that of the 500 cases thus collected, 276 were of the breast.§

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* This difference is to be explained by the circumstance that cases of cancer of the uterus are admitted into the Middlesex Hospital from, probably, all the other hospitals in London.

† J. Mason Warren, "Surgical Observations," p. 536, 1867.

Analysis of Mason Warren's Table of 154 Cases of Cancer.

38	Epithelial—32 of Face.
4	Fungoid—Hand, Ear, Thigh, Parotid.
8	Melanosis.
2	Colloid—Neck, Coccyx, and Nates.
1	Osteosarcoma—Thigh.
21	Encephaloid¶—Breast, 5; other parts, 16.
80	Scirrhus—Breast, 54; other parts, 26.
154	

59 Breast Cases—1 Man, Scirrhus. 58 Women—Scirrhus, 53; Encephaloid, 5.

‡ "Contribution to the Statistics of Cancer," by Septimus W. Sibley, "Medico-Chirurgical Transactions," vol. xlii., 1859.

§ "Contribution to the Statistics of Cancer," by W. M. Baker, "Medico-Chirurgical Transactions," vol. xlv.

¶ "I have not met with true Encephaloid in 10 per cent.; on the contrary, I have seen it but very rarely indeed."—J. Mason Warren.

Mr. G. Salle places the stomach and uterus as the organs most liable to cancer.* Reference to his statistics as having a pathological bearing will be made later.

Age.—The age of the majority of patients suffering from cancer of the breast is between the fortieth and fiftieth year, and, at first sight, this decade would seem to be the one most exposed to attack. Before giving to this circumstance its actual significance in estimating its true pathological bearing, it will be necessary to show the relative proportions of persons living at different ages, which has been done in Part II., *vide* p. 161.

Of 160 cases observed by myself in the Out-patient Cancer Department of the Middlesex Hospital, 36·87 per cent. were between 40 and 50 years of age. The following table shows the further analysis :—

AGE.				CASES.		
From 25	to	30	2	or	1·25	per cent.
„ 30	„	35	9	„	5·62	„
„ 35	„	40	19	„	11·87	„
„ 40	„	45	25	„	15·62	„
„ 45	„	50	34	„	21·25	„
„ 50	„	55	28	„	17·5	„
„ 55	„	60	13	„	8·12	„
„ 60	„	65	13	„	8·12	„
„ 65	„	70	10	„	6·25	„
„ 70	„	75	4	„	2·5	„
„ 75	„	80	2	„	1·25	„
„ 80	„	85	1	„	0·62	„
„ 85	„	90	0			

The earliest age of attack 28 years, the latest age of attack 82 years.

Mr. Birkett† gives 193 out of 458 cases of cancer of the breast as occurring in the fifth decade of life, that is, from the fortieth to the fiftieth year=42·16 per cent. Mr. Bryant‡ gives 144 out of 400 cases of cancer of the breast as occurring between 41 and 50 years of age=

* "Étiologie de la Carcinose." Paris, 1877.

† Holmes's "System of Surgery." ‡ "Practice of Surgery."

36 per cent. My own cases, as above stated, give 15·62 from 40 to 45 years of age+21·25 from 45 to 50 years of age=36·87 per cent.

Diagnosis.—*General Appearance of Patient.*—A special characteristic cachexia belonging to cancer has been denied, and the idea that such a condition had a diagnostic value has been repudiated, but that there is a cancerous cachexia may still be suspected. It does not follow that the cachexia should take the form of sallow, brownish skin, sunken eyes, attenuated limbs, integuments so wasted that the white tendon and blue veins shine through them,—the cachexia may have the exactly opposite outward appearance, namely, an excessive deposit of yellow fat. (*Vide* case 20.)

As will be seen further on, some writers have dwelt on the remarkably healthy appearance of cancer patients, I think, however, an undue importance has been placed on this "look of healthiness." Patients with cancer of the breast have frequently a "florid" complexion, from the presence of marked superficial vessels which give a false appearance, a counterfeit stamp, of healthiness. The skin is found to be thin and allowing the yellow colour of the subcutaneous fat to modify its tint.

But, in forming a diagnosis, one must remember that continuous profuse discharges, frequent and great hæmorrhages, will cause a patient to wear a cachectic aspect that might mislead.

Primary local Symptoms.—From the anatomical characteristics of the breast as a conglomerate gland—one of those glands in which the acini are arranged in lobules—as well as from the situation it occupies, the slightest alteration in any of its constituent tissues is almost at once perceptible, while the subjective symptoms so often attendant on cancer, which are common to some other conditions and disorders of the mamma, are not constantly present. It is in the thus early stage that the surgeon is called on to give a diagnosis, and has a most responsible duty before him.

Pain.—It frequently happens that the first time the patient becomes aware of anything being wrong with the breast is when a hardness or a tumour is accidentally discovered, there having been no antecedent

pain, or uneasiness, or unusual sensation to direct express attention to the part. Pain, nevertheless, in the acuter forms of cancer is extreme, and aggravated by sudden shooting neuralgic flashes of agony through the breast.

Also I have observed that pain is materially increased by changes in barometric pressure or change of weather—meteoric change. This is probably due to the same influence which gives rise to neuralgia in rheumatic patients, and causes periosteal swellings to be unusually tender.

The pain of acute mastitis, intense and steady, differs by spreading backwards towards the shoulder blade.

Retraction of the Nipple and alteration of the level of Breast.—The cancerous change is in the majority of instances an atrophic process, and there results no outgrowth but a wasting; the indication of this is shown in the condition of the nipple of the affected side compared with that of the other—the nipple is sunk in the breast instead of being protuberant. Further, the entire breast is displaced. A line drawn from one nipple to the other will be found not to be horizontal, but inclined towards the unaffected side. This is easily shown by placing a piece of string so that its position shall coincide with the line drawn from one nipple to the other; the nipple of the affected side will then be seen to be *elevated* above the true horizontal line of natural symmetry. An extreme illustration of the elevation of the nipple of the affected side is shown, Plate II. It sometimes happens that in a case of cancer the nipple may not have been elevated, but I have not met with an instance in which elevation of the nipple existed and cancer disease was absent.

Discharges from the Nipple and Condition of Nipple and Areola.—Coloured discharge from the nipple is a suspicious circumstance; an example is given in the case of cancer of the male breast (Case 57). A condition of the nipple and areola, usually described as eczema, and which has been suspected to be a *cause* of cancer of the gland itself, is possibly a reflex change due to the existence of commencing cancer, or may be a true cancerous state of the skin. Occasionally it occurs that

the lactiferous ducts become dilated and give origin to a discharge at intervals, without malign import, probably determined by the periodical excitement of the breast connected with menstruation.

Solidity.—It has to be remembered that cystiform disease will convey the impression of a solid tumour. For example, a patient, C—— R——, widow, age 46, admitted into Queen Ward, May 17, 1876, came under my care with a tumour of the right breast. The tumour itself felt hard and nodulated (the nodulations were shot-like). The case had been seen by Sir James Paget, who advised the removal of the tumour, but suggested that it might be cystic and contain fluid. Before operating I took the opportunity of drawing the attention of the students to the fact of the apparent solidity of the tumour, which, from the age of the patient, would most probably indicate its scirrhus nature; but I mentioned that Sir James Paget had suggested the possibility of it being, nevertheless, cystic, and that I would, in obedience to his suggestion, make an exploratory incision. On doing this it was found that the tumour was composed of numerous cysts containing brownish fluid, and that cystic degeneration extended beyond the actual tumour itself into the mammary gland, so that it thus became necessary to remove the entire organ.

Mobility.—An important point in the diagnosis by the touch, is the correct estimate of the reality of the movableness of the tumour in the breast, and its apparent isolation from the surrounding structures. A simple mammary tumour, an adenoma, will often appear so little attached to the rest of the breast, that it may seem to be easily moved about under the skin, which would only require to be divided to let it escape. Even in such tumour there may be adhesions at its deeper surface, which extend completely through the whole thickness of the gland, and be connected with the sub-mammary tissue; a scirrhus nodule may have this false appearance of isolation, and thus have its real character rendered doubtful until exploratory incisions shall have determined the question. This mobility of a scirrhus nodule is more likely to be met with in large breasts laden with adipose tissue, than in such as are less voluminous.

General Induration.—The general induration of the whole mammary gland, which would lead one strongly to suspect acute universal scirrhus, sometimes belongs to a non-malignant condition which passes away. What that condition may be, I am unable to say. It probably is of the same nature as the uniform induration of the testicle—of the whole body of the gland which is recognized as syphilitic sarcoma. In those rare cases of interstitial mastitis in which I have met with this condition, I had no suspicion of a syphilitic element in the case; there may, nevertheless, have been a history of syphilis, of which I had failed to obtain proof.

In the examination of an indurated lump in the breast, we have to note the mobility of the mass, its position in relation to the body of the mammary gland, the condition of the skin over it, the prominence of the subcutaneous veins, the state of the nipple, the sensitiveness to pressure and cold, the condition of the axillary glands as well as of the supraclavicular and cervical glands, the history of mastitis, either during pregnancy or lactation, or independent of either the history of mechanical injury, the history of any previous tumour; while a careful scrutiny of the opposite side should always be made.

The coincidence of other forms of mammary tumour with cancer is a point that is to be recognized as a complication in diagnosis. Mr. De Morgan, "Path. Trans.," vol. xxix., page 394, describes a case in which cancer existed in the one breast, while cystic disease occupied the other breast.

Mr. T. Smith, "Path. Trans.," vol. xxii., page 267, has described a remarkable case in which cystic disease accompanied the scirrhus in the same breast. In this latter case, the scirrhus had become partly obsolete, and of course the interesting problem remains to be solved as to the relation of the obsolescence of the scirrhus to the development of the cyst.

Cold and chronic abscess so long in forming and slow in progress, may render diagnosis difficult, as in the following case:—

Mary Lovell, age 30, admitted Nov. 1874, under my care, with this history: Jan. 1873, being pregnant received a blow on the breast; Feb.

1873, confined at full period; June, 1874, lactation ceased; Oct. 1874, a lump in the breast discovered: Abscess diagnosed and accordingly the necessary steps were taken, followed by speedy convalescence.

Prognosis.—One cannot too highly estimate the importance of the subject of prognosis, seeing that a marked failure of the justification by events of the prognosis given, reacts most injuriously on the patient's *morale*, and saps the confidence in medical science, creating a distrust which precipitates the sufferer into the hands of unscrupulous professors of curing the incurable.

The duration of the disease, or rather of life in cancer, may vary from months to years. The almost inevitably fatal termination of cases apparently similar is sometimes early, and sometimes long deferred. The patient may die within the year from the discovery of the nodule in the breast, or may survive from ten to twenty years. Prognosis is therefore especially difficult.

The prognosis on first seeing the patient, should necessarily be cautious. It is, however, during the progress of the case that symptoms may appear which are likely to mislead. I detailed in a paper read before the Clinical Society, 1872, the case of A. F., who had been under my care in one of the cancer wards of the Middlesex Hospital. She was admitted (having been an out-patient since July, 1868) in June, 1870. By the middle of July the patient could neither raise herself nor turn in bed; in October there was paralysis of both legs; in July, 1871, she had extensive pleuro-pneumonia of the left lung; but by July, 1872, the patient had so far recovered as to be able to walk across the ward, and she lived until August, 1872. The fuller particulars of this case (Case 14), extracted from the "Transactions of the Clinical Society," are given at page 73. In this case, could it have been otherwise than suspected that there was secondary deposit in the spinal cord, and that the chest symptoms were almost certainly due to a similar cause?

With a view of enabling the reader to become fully alive to the possibilities in the course of the disease, I have recorded in the following pages many cases which furnish examples of an exceptional

history; a careful attention to the dates in the perusal of some of them is asked for, where the progress is traced over several years.

Progress.—Cancer attacking the breast offers itself under the most favourable circumstances for observation. We can watch the local phenomena of the disease from almost the commencement. The progress of the disease is not complicated, at least for a considerable time, by implication of vital organs. So various is the course run by cancer, that it is difficult sometimes to convince oneself that the disease is, in the different cases, identical. The essential stages are, however, common to all—Deposition and Destruction. The character of the reaction of the tissues at the seat of deposit, and the activity of the destructive process, are prime elements in the apparent difference of the outward appearance of the disease. On the one hand we see atrophic changes producing a shrinking, or hypertrophic, giving rise to outgrowth and to cystic formation; on the other, inflammatory changes followed by softening, ulceration, and gangrene.

The progress of the disease has to be considered in its immediately local and in its general aspects. The plates from I. to VI. illustrate the changes that the progress of the disease works in the breast itself and its contiguous tissues. There are two complications near: first, the contamination of the axillary glands, and the consequent interference with the circulation of the upper extremity and implication of its lymphatics producing œdema, more or less solid, and almost always excessively painful, and otherwise distressing from the weight and immobility of the limb; and second, the direct extension of mischief to the thoracic cavity, independent of secondary developments which manifest themselves in distant organs. A reference to the Table of Post-mortems will show the relative frequency with which the lungs or other organs are the seat of secondary disease, as well as the almost constant presence of cancer in the axillary glands.

Secondary affection of the cerebro-spinal system and its envelopes, distinguished from ordinary paralysis, is rare, but it appears to me to be comparatively more frequent in the classes where the nervous system is the most highly developed, that is to say, I have seen a greater

number of cases in private practice than among hospital patients. The secondary affection of the nervous system may be located either in the brain or spinal cord. When the disease is in the brain the symptoms are more tangible than when the cord is affected, the locality of the secondary tumour being indicated by defined interference with the function of a cranial nerve, or some lobe of the encephalon ;—*vide* the case of E. Tibbs, page 83 (Case 19, post-mortem), *vide* also the case of Tree, page 81 (Case 18) ;—but in what I have assumed to be cases of secondary affection of the spinal cord or its membranes, neuralgia, continuous or intermittent, is the most prominent symptom, with inability to stand or get out of bed unassisted, obstinate pains in the hips and loins, like those of rheumatism (these pains become more continuous and severe), intense pain at various parts of the body on pressure, twitching of the limbs without pain. The access is insidious, and the ultimate development of the neuralgia constitutes one of the most serious and painful complications with which we have to deal, the cases being sometimes complicated with disease in the vertebral column itself, and absorption of the intervertebral fibro-cartilages. The spinal pains may commence in the cervical region, and extend to the branches of the brachial plexus, one or more fingers being especially neuralgic ; the neuralgic pain is sometimes compared by the patient to that caused by the application of a hot wire. These pains are not to be confounded with the neuralgia which may arise from implication of the intercosto-humeral nerves in the cicatrix after amputation of the breast. The pains, to which especial reference is being made, are in the track of nerves having no anatomical relation with the parts operated upon.

I have given an example in the case of Tibbs, in which the nervous symptoms observed during life were accounted for by the presence of a tumour situated at the base of the brain, revealed on post-mortem examination. Per contra, I have given an example of a case (No. 14, p. 73) where, apparently, the disease affected the spine, and though the paraplegic symptoms were distinct, they subsequently disappeared. Here I would observe that the occurrence of the secondary development, if such it can be called, is difficult of explanation by any of the assumed modes of transference of cancer from the site of its primary outbreak.

I have seen cases, after the removal of the breast, where the scar and mammary region remained perfectly free from any recurrence of cancer, while the patient was dying from exhaustion, consequent upon rachidian neuralgia. A case by Mr. De Morgan is reported, in which the spinal cord was secondarily affected in a male patient from whom he had removed cancer of the orbit; and he explained the spinal cancer, by supposing that cancer cells had escaped into the arachnoid space. (*Vide* "Trans. Path. Soc." vol. xviii.)

Whether the cancer in the spinal cord is a metastasis, or a fresh starting-point, or due to a migration of germs, are questions the answers to which are in some measure cleared by the history of individual cases. A case came under my observation where a tumour, assumed to be cancer, disappeared from the breast, and the patient died with cancer of the spinal cord; and cases have occurred within my knowledge where the cancerous breast had been removed, by operation, and where the patient succumbed to spinal mischief years afterwards.

The Question of Operation.—To get rid of a tumour *at once* by operation would seem a common sense proceeding; some consideration, however, is required, before taking this step. The theory that cancer is a local disease necessitates immediate operation, and those surgeons who hold and act upon this theory might reasonably be expected to produce an array of successful cases in evidence of the soundness of their views. So far as I am aware they have not done this. An indiscriminate action in operation will be attended, certainly, with a percentage of regrettable consequences, and the same may be affirmed of a headlong precipitancy in operating upon the theory that the disease is essentially local. In the discussion on Cancer at the Pathological Society, it was stated by Dr. Crisp that the conclusion to which Sir Benjamin Brodie had arrived, after five or six hundred operations, was, that the removal of the cancerous breast tended to shorten life: and it is probably well known that such was Sir Benjamin Brodie's opinion. But the operation of removal may be undertaken on principles which do not involve a belief in the local nature of cancer; for the disease is one which, from its innate tendency to degeneration and destruction, as

it were, endeavours to destroy itself.* We see the fatty degeneration of the cancer-cells, and we see the necrosis and gangrene of the tissues in which they are formed. The removal of a cancerous part anticipates events which would in the end spontaneously take place. The measures employed by the surgeon, whether knife or caustic, cautery or electrolysis, do quickly and extensively, and often painlessly, what would be slowly and painfully effected by acute inflammatory action and gangrene.

I have heard a surgeon, probably influenced, directly or indirectly, by Brodie's teaching, speak with bitter contempt of "giving the patient a chance," by operation in cancer. I have recorded an instance where I removed a fungus hæmatodes in the breast, of considerable size, and where the patient lived for five years subsequently in good health (Case No. 2, page 54, Mary Howard). It can hardly be imagined that without operation this patient could have lived a fourth of that period. The surgeon, to do justice to the patient, and to himself, should lay the exact state of the case before the patient, and the grounds upon which the operation is recommended. Mr. Birkett puts the matter in its true light, when he says, "The fact is, we believe, that in a great number of persons life may be prolonged, local suffering may be prevented, and much mental anxiety is sure to be avoided by careful and judicious selection of those cases in which the removal of the primary growth can be easily effected, and in which the constitutional powers of the patient render a surgical operation admissible." Mr. Birkett further says: "I cannot conclude without urging the expediency of removing the *first* growth of cancer in *select* cases. I do so upon the firm conviction, based upon experience, that by so acting life may be prolonged, a certain amount of immunity from bodily suffering and mental stress may be ensured, the chance of freedom from all local suffering is given, and that when unhappily the recurrence of the disease gives rise to ulceration, the duration of that distressing state is shortened." (Article on Diseases of the Breast, Holmes's "System of Surgery," 1st edit., page 691.) A

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* Vide Part II.

striking example of the contrasting results of operation and non-interference fell under my notice. Two sisters had cancer of the breast; the elder (by a few years) unmarried, was first seen by me, had a cancer of the breast, which I removed. About two years afterwards there was some return of the disease towards the axilla, which was also removed; no local return ever occurred, the patient ultimately died without pain, from cancer of the liver. The younger sister, who was married, but who had never borne children, also consulted me; she had a tumour of the breast. I advised its removal, but the patient declined to submit to operation. The tumour proved to be a cancer, and it ulcerated, and the patient died, having suffered great pain and misery for very many months from a wide-spreading sore. No two cases could apparently illustrate better the relative advantages of operation and non-intervention; the sisters, having strong family resemblances physically, both suffering from cancer in the same organ, and of the same character.

The divergence of opinion has arisen from the difficulty of arriving at a correct estimate of what is a "suitable case," and in what consists "fitness of the constitutional powers of the patient which shall render a surgical operation admissible." Operation has been variously advised when the disease involves the tissue of the breast only, and when the axillary lymphatic glands are not involved; when the disease has extended to the skin, but has not widely infiltrated the cutaneous tissues; and when ulceration has even taken place, although the axillary lymphatics may be distinctly perceptible and somewhat enlarged.

According to what I have stated, operation does not require for its justification any theory that the disease is of a local character, and that the system is contaminated from the first manifestation of the disease, "because of the manifest dependence of the later tumours upon the first;" nor is operation to be rejected because of an assumed constitutional condition. Operation steps in and anticipates the changes which would otherwise destroy the organ, and probably torture, and torture slowly, the patient. As I have met with an immunity from a return of local disease for sixteen years, one has, in my opinion, the right to act upon the chance of again

meeting with similar results. (*Vide* the case of Cameron, page 101, No. 36.)

Dr. Samuel W. Gross, of Philadelphia ("Practical Treatise on Tumours of the Mammary Gland," 1880), says (p. 164), "Not only is life prolonged by operation, but the removal of the entire breast along with any infected glands that may be discovered, that is to say, thorough operations, results in permanent recovery in 9·05 per cent. of all cases. . . . . a radical cure may be assumed if the patient has survived the disease over three years without local or general recurrence after the last operation." This is, I think, too favourable an estimate; and cases which I shall quote later will illustrate my meaning.

When an operation has been decided upon, the removal of the entire mammary gland must be complete. Any partial removal is not only useless, but worse than useless; the occurrence of the slightest speck of cancer in a gland declares that the whole organ is more or less ready for special degeneration. I would here say in parenthesis that there are certain forms of cystic disease to which the same rule applies; that is to say, that, although the disease may appear to be isolated, it will be found insidiously extended to other parts (*vide* Case S——, page 46), where to the touch the disease appeared to be quite circumscribed, while it really involved the entire gland.

The removal of the entire substance of the gland requires close scrutiny of the tissues through which the incisions have been made, as, especially towards the axillary boundary of the wound, outlying lobules of the gland may have been severed from the chief mass. Dr. Creighton ("Physiology and Pathology of the Breast," part i., chapter iv.) contends that the acini of the breast develop from a matrix-tissue at numerous scattered points or centres; that the matrix-tissue or embryonic cells are the same as those from which the fat surrounding the mamma developes, and that the mode of development of the acini is, for the individual cell, exactly the same process as in the development of the fat lobules. The mammary gland would thus appear to be a further specialisation of fat tissue and the product of the

mesoblast. It seems to be, therefore, possible that in some cases there may be scattered nodules of mammary tissue having but slight connection with the mother-gland, but which would be involved in the general disease. But beyond the question of operation in the first instance, there arises the equally important, if not more critical, question as to the course to be pursued in local returns of the disease. There should be no hesitation on the simple ground of the "tumour" being a recurrence. I have seen enough of the advantage of repeated operations to encourage me to say this; though there is a line beyond which little but disappointment is to be reaped—where the opposite breast has become involved in cancerous disease, and where the patient has grown much older, in constitution as well as in years.

In illustration of the course of events influenced by age where operation has to be repeated in consequence of the return of the disease after a long interval of immunity, I append the following case:—

A man æt. 60 was admitted into the Middlesex Hospital with cancer of the right side of the lower jaw *immediately recurrent* after an operation by Mr. Henry Smith. But, ten years previously, Mr. Smith had operated on him for the same disease, and had successfully removed it, so that he was free during the whole of the intervening period from any indication of its existence.

I found cancerous disease to be seated in the gum and contiguous mucous membrane of the cheek over a space probably not larger than a florin, the submaxillary lymphatic glands being unaffected. In order to have no impediment to thorough removal of the growth, I laid open the cheek by a horizontal incision from the angle of the mouth backwards. I cut wide of the disease and cauterised the surface and edges of the denuded part with red-hot iron. The incised cheek was re-united in the ordinary way and healed at once, but the cancer returned at least as quickly as after Mr. Smith's second operation. One may assume that there was no difference between Mr. Smith's first operation and his second, or between my operation and Mr. Smith's, to explain the rapid recurrence of the disease. An essential and undeniable change in the conditions under which

the two last operations were performed obtained, namely—the patient was ten years older than at the date of the first operation.

In vol. xxiii. "Path. Soc. Trans.," will be found the report of a case by Mr. Sydney Jones. A tumour of the breast remained quiescent for twenty-eight years; then, during four years, increased in size, was operated on, and in three weeks renewed itself in the ordinary manner of malignant disease. The first indication of anything abnormal in the breast was at the age of 27 years, a thickening after an abscess.

In estimating the prospects of advantage from the removal of a scirrhus, too much meaning must not be attached to the mobility, or the opposite condition, of the tumour, namely, that of adhesion to the subjacent structures. I have seen recurrence and the fatal termination of the disease rapidly follow amputation where the tumour has been movable on the chest-wall and not adherent to the skin, as in a case sent to the Hospital by Mr. Rutherford. On the other hand, I have seen a scirrhus of the breast removed where it appeared to me there was little prospect of good being done by operation, and immunity from obvious disease was enjoyed for four years. At the end of that time the patient died from some internal disorder, presumably cancer affecting the stomach, which caused persistent vomiting, and fatal asthenia. In this case the tumour was situated quite at the axillary border of the breast, and was somewhat firmly adherent to the tissues beneath. The patient was operated on by the late Sir William Fergusson, who removed only the outer border of the breast and the indurated axillary tissue, which required to be dissected off from the muscular fibres of the serratus.

As a further example, I was consulted by a gentleman concerning a tumour of the right breast. It was of the size of a small orange, and was attached to the breast by a neck having a somewhat smaller circumference than the tumour. The patient was 80 years of age. The skin covering the upper part of the pectoralis was brawny and discoloured. The patient was extremely anxious to have the tumour removed because of the inconvenience of the projection, and of a

copious watery discharge from it, which soiled his dress. I found to my surprise that the brawny condition was not due to any permanent change, and that under the repeated application of collodion it, as well as the discoloration, almost subsided, so that I felt justified in attempting the removal of the tumour.*

The Operation of Amputation of the Breast.—As a preliminary antiseptic proceeding, carbolic oil, one in forty, or even stronger, should be applied during forty-eight hours previously to the operation itself; it should be rubbed gently into the skin, and left with moderate abundance upon it covered by soft linen. The direction of the incision must depend in some measure upon the shape of the tumour and of the breast itself; but, if possible, so arranged as to secure drainage—free escape of exudation fluid, in the event of such being formed. Where one single line of incision will suffice, well and good; but it is sometimes advantageous to make a second incision at right angles to the first towards the axilla. The mere extension of cutting so slightly complicates the operation, that the gain of eliminating the irritation of confined discharge far more than outweighs any disadvantage of a larger wound.† The especial conformation of the thorax will, in some instances, give rise to the necessity for this second incision, the rotundity of the thorax varying greatly in different individuals.

* This I did by means of the galvano-écraseur. After the separation of the eschar produced by the cautery (the heated wire of the écraseur), the wound healed. The whole treatment was painless. One or two tubercles made their appearance soon afterwards, a little distance from the cicatrix (about an inch or so). The patient had some symptoms of bronchitis, but showed no other signs of ill-health. He left town for Brighton, where the bronchitic symptoms developed into an acute attack, and he quickly succumbed. I do not think that the chest affection was connected with the cancer, as we find that patients who die from secondary affection within the thorax, die for the most part with symptoms of effusion into the pleural cavity; and, moreover, there was so much bronchial catarrh at the date at which the operation was undertaken, that Mr. Everitt Norton, who administered the anæsthetic for the operation, was unable to employ ether for his purpose. Section of the tumour is shown in plate 20, figure 3.

† The use of decalcified bone drainage tubes, "resorbent drainage tubes," has been urged by Mr. MacCormac. They are said to have especial advantage where the surgeon intends to leave the dressing for days or weeks undisturbed.

The amount of subcutaneous tissue reflected with the flaps must depend upon the thickness of the adipose element. It is undesirable to interfere more than can be avoided with the vascular supply of the integuments, while it is absolutely essential to remove everything that can have been even approached by the "*infiltrating*" cancer cells. Shaving the under side of the skin, and making perforations, is liable to be followed by sloughing or ulceration, inevitably involving pain to the patient and delay in the convalescence.

To turn to the deeper attachment of the mammary gland, namely, to its connection with the pectoral muscle, it is there that especial care is called for. The gland is separated from the muscle by a very definite fascia, a fascia that in no way resembles the fascia lata of the thigh, but is continuous with the fascia of the abdominal muscles, and is distinct, or practically distinct, from the fascia proper to the gland itself; on the one side of this fascia we have the gland and its special vascular supply, on the other side the pectoral muscle. Now, when possible, this fascia should be left intact, because, on the removal of the mammary gland by operation, the vascular apparatus of the gland loses its stimulus, and the "affluxus" is ended. Not so with the wounded arteries of the pectoral muscle, the stimulus and affluxus remain, with perhaps an exalted stimulus and corresponding increased affluxus, and consequent exudation. There may be further and later inconveniences from the adhesion of the cicatrix to the muscle, and a mechanical impediment to the free movement of the arm.

If, however, it should appear in the course of the operation that cancerous invasion has extended through the fascia into the muscle, there is no choice in the matter, and the freer and deeper the excision the better. The muscular arteries divided thus are larger, and more easily isolated and ligatured, or otherwise provisionally occluded.

The search for enlarged glands in the axilla must not be made without regard to anatomical facts. In the first place, it is highly dangerous to allow the arm to be *extremely* abducted by the assistant; it must be borne in mind, nevertheless, that the position of the arm either much facilitates or impedes, as the case may be, the exploration of the

axilla. The assistant should have distinct instructions in respect thereof, as by wide abduction the axillary vessels are pressed downwards, or what is equivalent, are to the utmost extent exposed and put in the way of being injured. Of course, in opening the axillary fascia, the intercosto-humeral nerves are laid bare; when possible these should be left intact, neuralgia of the arm occasionally following from the entanglement of their cut ends in the cicatrix of the skin or in the deeper cicatricial tissue.

It may happen that the enlarged axillary glands can be enucleated by the fingers, without the aid of a cutting instrument; the stretching of the vessels, which this process of evulsion implies, prevents hæmorrhage; but it may be more safe to ligature the proximal attachments of a gland before attempting removal.

The closing and immediate dressing of the wound made by the operation are most important points to be considered. Large vessels are not likely to escape being safely secured, but sometimes a very small artery will, unless much care be taken to leave nothing to chance, cause troublesome hæmorrhage, and necessitate a re-opening of the wound. Probably each surgeon has preference in respect of ligature; whatever the material, it must be strong, easily handled, and indecomposable. Improvements in materials for ligature have not yet yet come to an end. The use of torsion to vessels expedites the ultimate complete cicatrization of the wound; but for small vessels is less applicable, as time is lost if the process fail, and it is always undesirable to keep a patient longer under the influence of the anæsthetic than can be avoided; nevertheless, no care or delay in making sure against secondary hæmorrhage is thrown away.

The vascularity of the mammary gland is extremely variable, and the apparent size of the organ is not a safe guide as to what may be expected in the way of hæmorrhage during the operation. A small firm mamma will generally be found to have a greater vascular supply than a large one more invested with adipose tissue. However, I have sometimes found that a small breast in the unmarried female, in whom probably there has been little reflex excitement, may be removed

without ligaturing or twisting a single vessel. I have observed in such cases that the adipose tissue is very yellow, and reaction is slow.

The employment of antiseptics is still in its infancy; whether the mischief-working molecules (germs) in the air are to be combated afloat, or whether the material in which they can become mischievous shall be so acted upon as to enable it to ignore their injurious meddling, is a point at issue. I have obtained repeatedly, with sulphurous acid, results as satisfactory as could be wished for. I therefore think that the exhibition of the carbolic spray is not demanded by the conditions. The carbolic spray is operative, very probably, only so far as it may act antiseptically on the surface of the wound exposed to its action, and *not* on the circumambient atmosphere.

The late Mr. De Morgan made frequent efforts to find a satisfactory antiseptic. He used amongst other things, tincture of aloes, rectified spirit, carbolic acid at the suggestion of Mr. Oscar Clayton,* and, finally, chloride of zinc, as a lotion to the surfaces of the wound after amputation of the breast. With regard to this latter agent I believe his bias was determined by what he had observed in the treatment of cancer by Fell's chloride of zinc paste. Mr. De Morgan's view was that chloride of zinc destroyed the cancer germs which might have escaped and become free in the wound during the operation, and thus might originate new centres of growth. I need not say that I do not believe in the possibility of any such occurrence.†

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* Mr. Oscar Clayton wrote to me thus: "I first had carbolic acid sent to me by the late Mr. Crace Calvert who made it. Crace Calvert had been attracted by the success of the French plan of using petroleum after amputation in the Crimean war, and set himself to work to separate the active principle of petroleum. I tried it in a case of a large carbuncle over six inches square between the shoulders, and I attribute the patient's recovery very much to the use of carbolic dressings, the first occasion in which they were used in surgery. I thus claim to have first in London used carbolic acid in surgery. I communicated my success to De Morgan and he afterwards went on with the employment of carbolic acid at the Middlesex Hospital."

† Mr. De Morgan also used the strong solution of chloride of zinc (forty grains to an ounce of water), in clearing out large abscesses, such as for example, lumbar abscess. His operations having this end in view were direct and bold; but though not

Sutures for closing the wound should not be sparingly used, and should be placed so as to fully secure the adaptation of the opposed edges of the flaps. When the edges of the flaps are of exactly equal length there is little trouble, but as it so often necessarily happens that the flaps have unequal length of edge, the excess of length of the one flap has to be evenly distributed in the adaptation, otherwise a fold is left which can only heal by granulation. Where any strain would occur, if the circumstances of the incision were to make the approximation of the edges of the flaps difficult, it is useless to put in sutures; strips of adhesive plaister must be substituted.

The moment for the removal of the sutures must be watched for. After the *seventh* day, if union be taking place, they are not needed, and may be a possible source of irritation. It is seldom that suppuration takes place along the track of a suture before the end of a week; but if the suture be rendered antiseptic, and other antiseptic measures be fortunate, suppuration is obviated.

I have used as a direct application to the surface of the wound made in the operation after all the bleeding points had been secured, carbolic acid and glycerine, one part of the acid to twenty of glycerine, pouring the carbolized glycerine freely into the wound, and with the fingers making a thorough contact with the denuded tissues. Mr. Casson used carbolic glycerine in the ambulances during the Russo-Turkish war, and his account of the results obtained encouraged me in persevering with this form of antiseptic. As an external "dressing," that is to say, as a covering to the surface after the edges of the divided integuments have been brought together, the carbolization as above formulated is unsuited, being too stimulating.

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impressed with the ultimate results, I admit that I was by the immediate relief and the absence of constitutional irritation.

The late Professor Partridge was one of the first, at the suggestion of Sir William Burnett, to use chloride of zinc in dilute form extensively for anatomical and surgical purposes. Under Professor Partridge's directions I had employed it in the anatomical department at King's College, and I invariably used it in the anatomical department under my control at the Middlesex Hospital School.

The surface of the skin is variously sensitive in different individuals, and it sometimes happens that carbolic acid is peculiarly irritating, so that a small blister consequent on its accidental external action will give more pain and discomfort than the operation-wound itself. Something of the same kind may be said of glycerine in respect of the skin. As an agent in the process of the prevention of exudation-zymosis it has its own value, independently of admixture with more powerful substances.

Sulphurous acid is invaluable: in the proportion of one part of the acid to six parts or eight parts of water, it may be applied either on lint, charpie, or cotton wool, or by irrigation.

I have obtained results, as before stated, with sulphurous acid as an antiseptic that could not be surpassed by the most rigid application of any of Professor Lister's several processes. Not only have the wounds healed without suppuration, but a *complete* freedom from feverishness, tested by the thermometer, was secured. The diluted acid must be thoroughly applied to the surface of the wound, and as an after-dressing on a compress, renewing it every *two or three hours*, or as often as the acid has vanished. The compress must be covered by a gutta-percha tissue; the surface of the skin of the "flaps" may be protected by a coating of collodion. It is almost needless to say, there is no antiseptic that will not, in certain individuals, prove irritating. Even glycerine occasionally causes redness and itching. I have, at page 52, given an instance of the singular advantage of sulphurous acid in treating an open sore.

Position after Operation.—A comfortable position for the patient after the operation is a matter of no small moment. Of course, it is an essential that the wound should be kept at rest; but there is no valid excuse for rigidly confining the patient to one fixed decubitus; a wakefulness which may easily culminate in feverishness is induced by the fear of movement. Pains in the loins and back are a very ordinary form of discomfort from a persistence in a horizontal position; the weariness of which can be easily imagined, and almost as easily obviated.

Caustics.—The employment of chemical agents (usually spoken of

as caustics), for the destruction of tissue has been unduly extolled, and as unduly neglected. One essential point to bear in mind is, that it is impossible to foretell what degree of suffering may be involved in their use; but to expect a longer immunity from return of the disease, which it is alleged is secured by these means, is to entertain a delusive hope; there are, nevertheless, certain conveniences, if not advantages, in using caustics in cancer, which it is well not to disregard or undervalue. It may happen that, after a commencement has been made in attacking the tumour by a caustic, the pain is so extreme that the shorter method of removal has to be substituted: this difficulty must be stated; on the other hand, sometimes the pain is described by the patient as being insignificant.

This especially applies to the treatment by what is called "Fell's process." Although applicable in some cases and sometimes attended by little pain, and having the advantage of not confining the patient to bed, it occasionally causes so much suffering as to be intolerable. The method of application is as follows: The skin over the tumour, and to a certain extent beyond the area of the tumour, is acted upon by the strongest nitric acid. This should be done under the influence of an anæsthetic. The following day this portion of the skin will be found to be hardened; it has then to be scored through at intervals of half or five-eighths of an inch, and into the grooves thus made strips of linen covered with chloride of zinc paste are inserted, that is to say, chloride of zinc with water and wheaten flour, coloured with cochineal (the colouring matter, making it easier to perceive the amount of paste used than if it were colourless, is added, for the purpose of convenience in preparing the dressing). Each day the incisions are scored again sufficiently deep to penetrate the tissue coagulated by the action of the chloride of zinc, and each day fresh strips of linen carrying the paste are pressed down into the bottom of the grooves. In making these daily incisions it is well to use a scalpel that is not too sharp, one that will scratch rather than cut, and that is tolerably thick in the blade, thus wedging open the groove. If the incision be advanced too quickly the fresh

living tissue about to be attacked is cut into, and, of course, blood follows ; this impedes the process, dilutes the chloride of zinc, and diminishes the amount of action on which depends the desired advance of the escharotic into the tissue beneath. It is convenient in the progress of the treatment, when the incisions have become deep, to use dressing forceps, or some similar instrument, to wedge open the wound in making the cuts, and in introducing the fresh strips carrying the chloride of zinc. After each dressing the breast should be covered with cotton wool. When the depth of the tumour has been reached the treatment must be desisted from. There is no rule that can be given as to the judging of the depth of the tumour, but a fairly accurate idea may be formed from the previous knowledge of its extent and attachments. Generally, after two or three weeks, commencing usually at the end of the second week, ulcerative absorption takes place at the margin of the area originally destroyed by the nitric acid, and extends thence deeply, so as to isolate the mass which has been acted upon by the chloride of zinc, which by this time will have assumed a dark-brown colour, somewhat dry and greasy-looking, by the absorption of the oily material escaping from the coagulated fat cells. This process of isolating ulceration goes on with varying rapidity, during which it may afford comfort to the patient to apply a poultice. The tumour will at last become quite loose, free escape of ordinary pus taking place from beneath it. If it now be gently raised, a few threads will be seen to be the only connecting links between the eschar and the body. These are the nerves which are rendered tough by the action of the paste. They require, of course, to be snipped through, and being already coagulated the snipping is painless. Generally, the removal of the eschar exposes a surface covered with healthy granulations, which requires the simplest treatment only during cicatrization. It is of the utmost importance that the application of the zinc paste in the first instance should be wide enough, and it is of equal importance that it should not be carried beyond the sub-mammary fascia, because it is quite possible that the penetration of the pectoral muscle may be followed

by exposure of the ribs to the action of the paste, and to their consequent destruction. I have seen exfoliation of portions of the rib occur, and in one of my own cases, the destruction of the entire thickness of the rib, and exposure of the pleura costalis; (in this case I must state the patient was a person of very delicate tissue; the tumour was probably of a sarcomatous character, the granulations being pale and succulent, and the action of the chloride of zinc paste excessively penetrating). No injurious results followed that I became aware of, but, at the same time, it was not what I wished for, and was evidence that on some peculiar form of tissues the destructive action of the zinc may be greater than anticipated.

The advantage claimed for the treatment by chloride of zinc, in respect of its offering immunity from recurrence, has not been justified, patients having come under my care at the hospital with recurrence who had been treated by others on that system. With regard to cancer in other parts of the body, I ought here to state that the treatment of rodent cancer with the chloride of zinc paste enables the surgeon to confer at least temporary benefit, and benefit invaluable and unquestionable; but in removal of mammary cancer it has probably little value beyond that of having the name of treatment without the knife. The same may be said of treatment by sulphuric acid (Michel's process), or any other treatment by chemical agents. It has happened to me to meet with instances in which the cancerous disease was never overtaken by the chemical process. Such a case came under my care in my cancer ward at Middlesex Hospital, where a patient was admitted with ulcerated cancer of the breast, after having been treated at an hospital where especially Michel's process has been most completely followed. Of course cases are met with (*vide* that of Ann Wright, Case 51), where the disease returns in the breast before the wound of the operation is healed; but no arrogant claims of exemption from return of disease have been put forward of that character in favour of the knife. M. Gosselin—"Clinique Chirurgicale de l'Hôpital de la Charité," 2nd édition, Paris, 1876—gives preference to caustics over the knife, because the use of caustics is less often followed by erysipelas. He represents

erysipelas as occurring with a frequency of a fearful character, and an excessively high death-rate after operations by the knife, but by the use of chloride of zinc in the form "flèches caustiques" he had only two cases of erysipelas in 25 cases; yet he admits that in some cases, as, where the tumour is very voluminous, the knife is to be preferred. M. Gosselin describes the process of "flèches caustiques" of Maisonneuve, which consists in thoroughly penetrating, in vertical and horizontal directions, the tumour; each "flèche caustique" destroying the tissue about a quarter of an inch from its point of application. He describes the separation of the eschar, after fifteen or twenty days and the resulting wound, almost exactly as I have already done.

Dr. Tanner ("Cancer of the Female and Sexual Organs," 1863) says,—"With regard to the removal of malignant growths by caustics my experience has not been very limited, but I am obliged to confess that this plan of treatment, which in some respects appears so promising, fails to cure the disease. In one of scirrhus of the breast, hopes were raised that permanent good had been effected, but the patient and myself were deceived and disappointed." He gives a second case at some detail, in which a tumour of the breast was removed by caustic by another medical man. The patient was 38 years of age. It was situated in the right mamma, and was the size of a hen's egg. There was another tumour of smaller size in the opposite breast. The larger tumour had been discovered only four months, the smaller tumour had existed four years. The treatment of removal by caustic, Dr. Tanner states, occupied six weeks, and three or four weeks elapsed before the sore healed. The process was described by the patient as attended with intense pain. Within a month the patient had severe pains in her right side, which soon affected the shoulder, arm, and head; in another she could take nothing but arrowroot, brandy and water, and the like. Her sufferings continued to increase, the neuralgic pains extending from the neck to the knees, and her death took place in January of the following year, one year from the date of her first seeing Dr. Tanner.

This case is interesting, as illustrating the occasional intensity of the pain in the treatment by caustic; in the rapid death of the patient; and, as I interpret the symptoms to indicate, in the secondary affection of the nervous system.

[Another very interesting case of acute cancer is also given. The patient was seen July 1st, 1861, by Mr. Bannister. The right breast was hard but not very painful, the condition had been discovered only three months. She was submitted to an operation in a private hospital, remaining well after convalescence until September, when there was considerable thickening and hardness about the cicatrix. The right arm was much swollen and very painful. Dr. Tanner saw the patient, with Mr. Bannister, on the 31st October, when he found malignant disease of the cicatrix extending across to the left breast. Death took place in three days. This case is an example of the condition which I have elsewhere ventured to suggest as chiefly situated in the lymphatic system; the length of time elapsing from the discovery of the first symptoms and the fatal issue being seven months. Dr. Tanner makes reference to the discussion on the curability of cancer, which took place at the French Academy of Medicine, 1864, where M. Velpeau asserted that he had operated on 250 cases in which the patients survived the operation. Of these twenty remained free from disease for five, ten, fifteen, twenty, and even twenty-five years. Dr. Tanner considered this proportion of "cures" so astonishing, when compared with the results obtained by other surgeons, that he regretted no attempt has been made to deduce the cause of success.

I stated at a meeting of the Clinical Society that I had found that one case in thirteen on an average would last from ten to twenty years. This proportion of survivors is pretty much the same as that of M. Velpeau.]

Bardeleben says, "Lehrbuch der Chirurgie," p. 496, 1ᵉ Band, 7th edition, Berlin, 1874,—"As it is of primary importance that the lines of separation in the sound tissue should be fifteen millimeters, at least, distant from the limit of the cancer, the application of caustics, apart

from other drawbacks, causes too great destruction on the one hand, and on the other hand does not afford so much certainty as extirpation with the knife, during which one can supplement the diagnosis and make the incisions accordingly."

Comparative Value.—The following case illustrates remarkably well the relative advantages of the cutting operation and caustic in the removal of a tumour:—Miss K. S., sent to me by Dr. Ayling, of Great Portland Street—Cystic Disease. She had a bruise on the breast about 1870, a tumour formed, which was removed by the knife by Mr. Heath, April, 1872; a second tumour formed, which was removed by caustic by Dr. Fell, October 20, 1873. I saw the patient in May, 1875, with some return of the disease in lobes of the breast that had been left remaining after the two operations described. There was some cheloid thickening at the cicatrix from the caustic. After the cutting operation by Mr. Heath the patient had little pain, except for two or three days immediately subsequent to it being done; whereas the caustic treatment required daily manipulation for five weeks, and pain was experienced throughout the whole of that period.

Electrolysis.—I have employed the electrolytic process in the removal of secondary tubercles occurring after the removal of the primary disease, and have known of its employment on a large scale to the primary mass itself. I have seen the scar resulting therefrom as perfect as could be wished, and have heard the patient describe the process as having been but slightly, if at all, distressing. It involves, it should be stated, a long exhibition of an anæsthetic; this could hardly be considered a very weighty disadvantage. On the other hand, from what has come to my knowledge, the electrolytic method of destruction of the tumour does not always succeed in overtaking the advance of the cancerous disease.

Treatment by Acetic Acid.—So much was promised for the solvent action of acetic acid in dispersing cancer that it is necessary to give some details on this subject. I have related a case (Williams, p. 79), where it was applied by the gentleman who advocated its use; and Mr. Moore made experiment with acetic acid injected into some

cancerous "growths." In "Trans. Path. Soc." vol. xix. p. 375, a case is reported by Mr. Moore where the patient had undergone two operations for removal of cancer of the breast, and who came under his care with cancer of the axillary glands. These cancerous glands he removed. In a few months the patient returned having four cancerous nodules near the scars of the two first operations (on the breast).

At various times during several subsequent months Mr. Moore injected each of these nodules with acetic acid. In the course of a month, after injection, each nodule entirely disappeared; but after a couple of months more it returned. After having removed all the tumours by acid, Mr. Moore employed a needle connected with an india-rubber ball and tube, invented by Mr. Clover, and caused a solution of acetic acid to trickle slowly out far into all the textures in which the nodules had grown. In August, 1867, the patient left Mr. Moore's care without any trace of cancerous disease remaining; but in November she came back, having in other situations about the first scar three distinct subcutaneous cancerous nodules, one of which was as large as a cherry-stone. Mr. Moore at once excised the whole mass of scar, nodules, and surrounding textures.

The specimen exhibited at the meeting of the Pathological Society consisted of a linear cicatrix having on each side of it skin with the pores a little enlarged, and beneath, two small, hard, cancerous nodules; a third infiltrating mass, which was flat and firm, and was white and wavy in section; one cyst-like cavity as large as a cherry-stone, filled with liquid fat, and numerous black streaks or fine cords running in various directions through healthy subcutaneous textures. The first consisted of ordinary microscopic nucleated cells of scirrhus and a small quantity of fibrous stroma; the second, when magnified, was almost wholly composed of white wavy interlaced fibrous tissue, enclosing spaces in which were nucleated cells and oil globules; the third, which flowed out in the operation, appeared to be pure oil; the last was pigment, probably the residue of blood poured out in the tracks of numerous punctures with the hypodermic needle.

Report by the Committee on Morbid Growths, 7th January, 1868:—

"The specimen. . . . . consists of a piece of skin three inches in length by one inch to half an inch in width, with a sinuous tissue cicatrix about one inch and a-half long in the middle, attached to it are portions of areolar and adipose tissue, and a quantity of muscular fibre. The whole is greatly indurated by the action of the spirit in which it has been preserved; in consequence of this induration the morbid appearances described by Mr. Moore, although still traceable, are somewhat indistinct. A section through one of the firmer masses discloses a fibrous structure dotted with yellowish points; on microscopical examination this stroma is seen to consist of interlacing bands of fibres, the majority closely resembling the ordinary white fibres of connecting (*sic*) tissue; but there are also a considerable number of yellow tortuous fibres. In the interspaces between these fibres there lie fat-cells, of which the yellowish points mentioned above are found to consist; and also numerous collections of minute cells averaging rather less than the $\frac{1}{3000}$ of an inch, but so shrivelled that it appeared hopeless even to guess at their original characters. Nothing, however, was found which could throw the least doubt on the accuracy of Mr. Moore's description of them in the recent state. Here and there among the bundles of fibres were collections of granules and nuclei-like bodies, whose appearance and arrangement suggested the idea that the so-called proliferation of the areolar tissue was taking place."

Treatment of Cancerous Sores.—There is a great difference in the personal tolerance of various agents used for the purpose of disinfecting or deodorising; a choice of such therapeutic means is therefore required. A deodorant may be ever so effective, but at the same time it may give rise to such irritation as to be insupportable by the patient. Carbolic acid, for example, with certain individuals irritates the skin,even when very dilute. Sulphurous acid, although it does not irritate the skin when dilute, gives rise, sometimes, to great pain if applied to a sore. Iodoform has the reputation of being a disinfectant and sedative. Mr. Lund* has spoken highly of it. He says:—"As far as local pallia-

* "Palliative Medicine and Palliative Treatment." E. Lund, Surgeon to the Manchester Royal Infirmary, 1880.

tive treatment, where cancer is on the surface of the body and in the ulcerative stage, among many things which have been tried to diminish the fœtor of the discharge, I have seen the greatest good arise from dusting the surface with very finely-powdered iodoform." But my own experience does not corroborate his favourable statements. "Again, to relieve the pain of malignant growths, various means have been tried from time to time; and in each particular case it may happen that one form of sedative seems more suitable than another; but, judging from experience, there are only two sedatives which have held their own for a long time, in the relief of the agonizing pain of malignant growths, namely—morphia given hypodermically, or conium, internally, or a combination of the two remedies, internally."

In July and August, 1862, I administered iodoform in ten cases where pain was a prominent symptom (six of pelvic cancer, one of epithelial cancer, one of lumbar pain without obvious cause, and two of neuralgia). In no instance was a satisfactory result obtained from its use. It either produced no effect or gave rise to pain in the back of the head, and apparently caused diarrhœa. I discontinued to prescribe it as an anodyne.*

The fœtor constantly attendant on cancerous sores is due to the gangrene of tissue, to the decomposition of the discharge and of the blood derived from capillary hæmorrhage. The gangrenous process affects occasionally, not only the tissue that has become the actual seat of cancer, but also the neighbouring structures, skin, subcutaneous cellular tissue, muscle, fascia, periosteum and bone. The chemical difference in the composition of these various tissues will imply, of course, a difference in the products of their decomposition. It is with the volatile products that we have chiefly to deal. Sulphuretted hydrogen and sulphide of ammonium are the most obvious constituents, but there are, besides, other substances of more complex nature that help to make up the sum of offensiveness. In order to cleanse and to keep clean a fœtid sore, it is necessary not only to

* For syphilis I have often since used it, occasionally with advantage.

destroy existing volatile matters but to chemically act on the tissues immediately threatened with destruction, so that their necrosis shall be odourless. In Plate I. is represented the appearance of a sore where the discharge was ichorous and fœtid, the exudation being yielded by the base and wall surface; and in Plate V., at the upper part, is shown not only a portion of the cancer itself dead and black; but as well, an overhanging margin of skin in a similar state.

For permanent dressing the application must be such as will not irritate and aggravate pain, while to secure prolonged freedom from fœtor, a temporary smarting is a comparatively small price to pay for the very definite advantage gained by relieving the part of the poisonous presence of decomposition.

In using a substance as a disinfectant, it is a question whether a deodorizer is all that is being employed for the purpose—a disinfectant really meaning something which shall prevent matters produced in a sore, or from a surface not strictly speaking a sore, from injuriously reacting upon contiguous parts—that is to say, which shall render innocuous that which arises from diseased action, which shall "take the sting out" of discharges. It is obvious that it is really a chemical action that is required. There are no mysterious special "disinfecting" properties in the many so-called disinfectants, apart from their peculiar chemical reactions. Disinfectants may be regarded as of two classes—those that act upon the volatile products of disease, and those that, as it were, strangle in their birth the albumenoid molecules ready to take wing in another form. The chemistry of decomposition is very complex; slight variations of temperature, for example, cause differences in the re-arrangement of the atoms, giving results having widely different properties. Organic chemistry affords manifold illustrations of this; there is the familiar instance of ordinary fermentation, for example.

In choosing a "disinfectant" one is limited by the possibly irritating quality of the disinfectant itself. Granted at once that invisible or visible particles, ever present in the atmosphere at ordinary levels, are the most usual cause of decomposition and harm, there

still remains, as the other factor in the problem of securing safety, the nature of the stuff upon which these invisible or visible atoms can exert their pernicious influence. But chemical changes are beyond the tangible—change is determined by conditions inscrutable. Certain changes in a solution may be determined by the presence of a substance which shall itself undergo no apparent alteration.

A low temperature—cold—could hardly be called a disinfectant, except by anticipation; at a certain degree of cold, decomposition of the ordinary character under consideration is impossible—it brings about molecular stasis.

At the suggestion of Mr. Thomas Taylor, I made trial, as a deodorizing dressing, of cotton wool saturated with acetate of lead and then thoroughly dried. The cotton wool on being restored to its original lightness is able to absorb and fix to a considerable extent the sulphuretted hydrogen and sulphide of ammonium.

As direct disinfectants and antiseptics I have occasionally employed nitrate of lead in solutions of various degrees of strength, from five to thirty grains to the ounce of water, solution of catechu, solution of tannic acid, solution of iodine, solution of chlorine, or a combination of iodine and chlorine, solution of permanganate of potash.

Nitrate of silver is a powerful antiseptic; it may be applied either in a concentrated solution or in the solid form, according to circumstances. In such a case as is illustrated in Plate V., where part of the sore is seen black in a gangrenous condition, it would be better to apply the nitrate of silver in the solid form, pointed so as to enable it to be thrust into the substance of the dead part immediately in view; a very strong solution may be freely injected into excavations. I first saw nitrate of silver used as a disinfectant in the wards of the Hôtel Dieu in Paris by M. Jobert de Lamballe in the treatment of gunshot wounds from the fighting of June, 1848. In the Middlesex Hospital I treated a case of compound fracture of the humerus in a young woman, by the free use of strong solution of nitrate of silver syringed into the wound (the injury having resulted from her being run over by a heavy vehicle—and the mischief being extensive);

contrary to the expectation of an Edinburgh surgeon, who accompanied me in one of my visits to the ward, the limb was saved.

The use of nitrate of silver must not be entrusted to an ordinary nurse, whose judgment as to where such a potent agent should be applied ought not to be depended upon.

A patient in the Middlesex Hospital, admitted under my care, with an extensive open sarcomatous cancer of the breast, that is to say, a cancer where abnormal tissue took the form of roundish semi-transparent nodules, similar to the condition shown in Plate VI., was liable to severe losses of blood by rupture of the peripheral capillaries of the new growth. The discharge from the sore was purulent and somewhat offensive, from decomposition of itself, and not from gangrene of the cancer tissue. The surface of the sore was thus kept in a state of sub-acute inflammation, just as the surface of the skin might be irritated and inflamed by an acrid discharge. The capillary walls were from this cause weakened, and rendered prone to give way under circumstances, whatever they might be, which would not otherwise cause hæmorrhage. At the suggestion of Dr. Woodham Webb, who was visiting the hospital with me, I had carried out irrigation with weak solution of sulphurous acid (by means of the suspended bottle and syphon-threads). The result was that the "disinfection" abolished the irritation from decomposing pus and other molecular debris, and the succulent nodules became covered with a thin epidermal layer; consequently the recurrence of the bleeding was prevented, and a source of infinite anxiety and trouble to the attendants removed. At the same time the patient regained her appetite and gathered flesh.

The treatment of the sore in the sloughing stage requires not only local but constitutional remedies. The process of sloughing is generally accompanied by intense pain and angry redness round the sore. I recommend that a full dose of chlorate of potash and carbonate of ammonia be given—say, ten grains of the former and four grains of the latter, every three or four hours, in addition to the ordinary sedatives. Also an exceptionally liberal allowance of wine; notwithstanding, as

a general rule and for habitual use, large quantities of alcoholic stimulants appear to be useless, if not injurious.

Constitutional syphilis may sometimes reassert itself in the course of treatment of cancer, and it may mislead one before its existence is detected. One is justified in saying that the possibility of such a complication should not be lost sight of, even in apparently the most unlikely subjects. In a case which I operated on in the Middlesex Hospital, some anomalous symptoms showed themselves just immediately before an outbreak of syphilitic skin eruption. In another case enlargement of the cervical glands, in the side opposite to that from which I had removed a cancerous breast, was not understood by me until shortly after unmistakable periostitis of the tibia afforded an explanation of the phenomenon.

I shall now endeavour to give the details of typical cases—cases which furnish illustration not only of the average course of cancer, but of the extremes; and in these my object is to supply the reader with facts from which he may himself form conclusions.*

1. *Scirrhus of right Breast—Sloughing of centre of mass—Reproduction of Cancer at margin of sore—History of Rheumatism and Gout—extension to left Breast.*

Catherine Shuttleworth, æt. 53, came under my care February, 1862. She was a short, feeble-looking woman. There was a red nodule in the right breast, which was not generally painful, except at change of the weather; it itched very much. This tumour had been about eighteen months in forming. She had gouty finger-joints, and had suffered much from rheumatism. Twenty-seven years since she had rheumatic fever, and dated her liability to rheumatic pain from that time. In April the patient reported herself "better altogether, having less pain." In July, the same. In September, the centre of the nodule, which had rapidly enlarged, had begun to slough; the veins in the tissues surrounding had dilated. In October her general health was yielding to the tax of local irritation, and

* In quoting from the Cancer and the *Post-mortem* Registers I have done so almost *verbatim*.

she was admitted in-patient. Plate I. represents the state of the sore. The drawing shows a deep hole in the breast, of over two inches in diameter, with a greyish "foul" base and irregularly circular, with sharp-cut sides equally foul, but more obviously vascular. The immediate edge surrounding this pit is slightly everted, and beyond this everted margin a rounded raised collar, about half-an-inch in width, of new formation, highly vascular, marked on the surface by numerous thin-walled vessels (veins). Its periphery bulges over when it rests on the breast, with the integument of which its thin cuticular coat is continuous. At the segment, however, nearest the nipple, this bulging of the border of the sore is absent, and a contraction replaces it. The cutis is œdematous, and is swollen up between the orifices of the ducts of the sweat-glands, and of the follicles; thus leaving them in little depressions. The true continuous inner margin is, however, uniformly everted; the discharge from the sore was of dirty, fœtid, brownish fluid. The steps by which this condition of parts was arrived at were the following: First, the painless deposit of cancer material giving rise to some increased local vascularity; then the further extension of the deposit, so that it had outgrown its capability of retaining its vitality, and became a gangrenous slough.

The patient died in December the year following. Here is a case that lasted over a period of about three years: at first little inconvenient, then intensely painful; then exhaustingly straining the constitutional forces by gangrenous inflammation and septic discharges.

Post-mortem Examination.—The left breast had become cancerous, and also the axillary glands on both sides. The sternum was infiltrated. There was pulmonary subpleural cancer, and cancer of the supra-renal capsules, and of the brain and base of skull.

2. *Fungus Hæmatodes—Operation—five years' interval before return—Family History of Phthisis.*

Mary Howard, æt. 62, came under my care May 25, 1865, first as out-patient, with fungus hæmatodes of the left breast. Her family history is remarkable. She was married æt. 19, and had

borne seventeen children; she generally suckled twelve months. Her father, a Scotchman, died æt. 70; her mother æt. 90. She herself was the seventh of a family of fourteen; her youngest sister died of a tumour in the abdomen; a sister, æt. 35, a sister, æt. 25, and a brother, æt. 30, died of consumption; a brother, æt. 61, of diabetes.

She was admitted in-patient June 2, 1865, into Stafford Ward. (Her case is No. 27, Cancer Register, vol. vii.) The following notes are extracted from the Register:—

"A large tumour in the left breast about the size of a cocoa-nut, not quite movable at base; at the lower part the tumour is ulcerated, and the ulcer presents a ragged fungoid appearance. There is some retraction of the nipple, but the patient states that the retraction is not more than usual. The patient loses blood from the ulcerated surfaces and has occasionally an aching pain in the tumour, but not severe. There is one hard gland in axilla about the size of a small walnut.

"Six months ago patient first noticed a small lump in the breast, which gave no inconvenience until four months since, when it became painful and discoloured, and much increased in size. She applied to a medical man, who gave her something to paint it with.

"Soon afterwards the skin ulcerated, and a large quantity of blood and matter was discharged. The tumour and ulcer have been increasing in size, and there has been some bleeding ever since, but the patient has suffered comparatively little pain." The affected breast had been inflamed during lactation on four occasions.

A few days after admission I removed the breast: in consequence of the size of the breast, the incision was from twelve to fourteen inches in length. I did not meddle with the axillary gland. Contrary to my expectation, the patient appeared to suffer nothing from the operation, not even losing a night's rest. . . . . I find a note dated January, 1866, to the effect that the patient was quite comfortable and that the axillary gland had not enlarged. The patient on leaving the hospital resumed her ordinary avocation, and thereby was able to support herself.

The patient was seen by me as out-patient February 10, 1870, when I noted that the arm swelled; and on May 12, when the breast bled; and she was re-admitted June 4, 1870. Thus, after a lapse of *five years* from date of operation, her condition was as below described:—

About the centre of the scar of the operation is a papillary, red, ulcerated projection, extending upwards and towards the axilla into a hard firmly-fixed mass, the skin over which is not involved. The patient suffers much pain in the left arm, which is somewhat œdematous; she describes the arm and hand as numb: it is *not* different in temperature from the right. No pain on coughing or sighing, but the breathing is very distressed, and she has much rattling cough. She looks ill and sleeps badly, but takes her food. Death occurred June 18, 1870, *i.e.* a few days after admission.

Post-mortem, June 20, 1870.—"A cicatrix extends from sternum to left axilla; about the centre of the cicatrix and near the usual situation of the mamma, is a small raw-looking cancerous mass the size of a walnut; in the outer border of axilla and slightly above the cicatrix is an indurated gland the size of a small hazel-nut.

"Left lung adherent, somewhat congested, and immediately under the visceral pleura are three small cancerous nodules, none more than three lines in transverse diameter. Right lung pushed upwards by a collection of pleuritic fluid, which was contained in a cavity formed by the wall of the chest, mediastinum, diaphragm and base of the right lung. The cavity contained about 20 oz. of thin bloody fluid. The diaphragm and other walls studded with cancerous masses, varying in size from a walnut downwards, most of which were softening; some of these were the seat of extravasation of blood. The lung everywhere adherent and crepitant, pleura studded with deposits of cancer. . . . . Glands in anterior mediastinum the seat of cancerous infiltration. Some recent lymph in pericardium. Heart weighed 10½ oz., very soft and fatty; liver weighed 53¼ oz., contained a few small cancerous deposits on the upper surface where it came in contact with nodules on diaphragm. Uterus contained a small polypus.

3. *Scirrhus of Breast—Amputation—Rapid recovery, living in* 1881.

Eliza Searle, æt. 53, from Hammersmith; admitted, Regent Ward, September 6, 1871. Under the care of Mr. Morris.—*State on admission* (from ward card). "In the left breast is a hard circumscribed tumour, the size of an egg; it feels lobulated on the surface, and is freely movable on the chest wall. The skin over it can be pinched up. There is a very small indurated gland in the axilla. The patient was first aware of the tumour six weeks ago, and she does not recollect having received a blow on the breast."

September 8.—Under chloroform. Breast with tumour removed by elliptical incision; a few minute vessels were twisted, no ligatures used. Wound washed with lotio zinci chloridi, gr. ii., aq. ʒi., and sutures put in. Dressing of carbolic oil, pad, and bandage.

September 9.—9 p.m. P. 68; no pain in breast. The catheter required for relief of bladder. Some pain in the lower part of the abdomen. Patient states that to relieve an uncomfortable feeling, caused by a displacement of the uterus, she has been in the habit of frequently changing her position in bed, and that the lying so long in one position, as she had done for over twenty-four hours, was probably the cause of her uneasiness. September 10.—Passed urine during the night. Bowels acted, after a dose of castor-oil, but there is still some pain in the lower part of the abdomen. The breast is quiet, the incision appears to have united throughout. Tongue rather furred. Pulse 72. September 11.—Slept well last night, pain in abdomen much diminished. The breast is perfectly quiet, the incision has united without any suppuration. There is some ecchymosis over the upper flap, all sutures removed. 12th.—Breast continues quiet. Wine ʒii. 13th.—Going on well, no pain. 15th.—Union complete. 19th.—Was out of bed yesterday. 23rd.—Last night had some pain in both shoulders, which disappeared on lying down. 26th.—Discharged convalescent.

Mr. F. H. Alderson, of Hammersmith, formerly resident Medical Officer of the West London Hospital, had the great kindness to follow

up the case, and he reports, November 19, 1880, as follows:—"I consider Eliza Searle fairly well for her age, she is not much emaciated; four or five years after the operation in the Middlesex Hospital, the cancer began to show itself in the cicatrix: there are now two nodules, respectively of the size of a hazel-nut and a walnut. The axillary glands are not affected, and she does not suffer much pain. The growth appears to be very slow. E. S. has no constitutional symptoms, no sickness, no especial weakness, all her symptoms are local. As far as I can see there is no reason why she should not live for several years. I have occasionally noticed when the regrowth is slow, and no acute symptoms—no acute pain, and the axillary glands remained unaffected—the patient may live on and die of some other disorder." (F. H. A.)

4. *Cancer of left Breast, eighteen years' duration—Three years' interval between discovery of "Tumour" and operation; four years' freedom from return—extension to right Breast.*

Sarah Riley, æt. 51. No. 90, May 2, 1871.—The note on ward card is as follows: — "Over the sternum, on a level with the fourth intercostal space and towards the left side, is an irregularly-circular, hard, raised tumour, the surface of which is ulcerated and presents a bright-red margin with a yellowish moist centre: at the inner and lower border is a puckered depression covered by a scab, the remains of the nipple. The mass is not movable. The glands in each axilla are hard, enlarged, but movable."

The line of an incision (cicatrix) is visible on the left mammary region; at the inner extremity of this line there is a hard elevated nodule, half the size of a hen's egg, which is depressed in the centre. Glands of *right* axilla enlarged. Over the abdominal wall a number of hard nodules; the veins are abnormally prominent. Eighteen years ago a small tumour first appeared which in three years grew to the size of a small egg. This was removed by Mr. Spencer Wells fifteen years ago, when only a small portion of the breast was taken away.

Four years afterwards another tumour commenced near the nipple, which has slowly increased and destroyed the nipple; for about one month small wart-like nodules over right breast have been noticed. During the past four months health has been rapidly failing. Death, May 30, 1871.

Post-mortem.—Pleura of both lungs seat of several small, irregular flat patches of cancer; at anterior margin of right lung two nodules the size of a marble, others the size of an olive, which are quite superficial and could be easily detached. In the liver a number of white round deposits of cancer varying in size from that of a marble to that of a small shot. Membranes of spinal cord slightly congested. Heart weighed 8½ oz.; right lung, 18 oz.; left lung, 11 oz.; liver, 45 oz.

5. *Scirrhus of Breast—Amputation—Immunity from Recurrence during two years.*

Caroline McGuinness, 7, Earl Street, Chelsea, underwent amputation of the breast, by me, March, 1867. On December 24, 1867, she was examined in the presence of Messrs. Colborne and Webster, students at the hospital, when no remnant or return of the disease could be discovered. She was again examined in the presence of Mr. Rees, of Hampstead, April 24, 1868—no evidence of induration or return of disease. She was again examined October 6, 1868—no return of disease at the site of the operation, but there were suspicions of nodules in the liver. She was examined again April, 1869, when a small "lump" was discovered at the *upper* border of the cicatrix of the operation. She was re-admitted September 9, 1869, with symptoms of carcinoma of omentum, and she died October 15, 1869.

6. *Chronic Cancer of Breast*, 14 *years' duration, at first painless.*

Mrs. W——, æt. 60, consulted me in November, 1862, for cancer of the left breast. There was central depression of the gland and retraction of the nipple; the disease had existed already twelve

months. There was no pain, nor was the breast tender; *the first-discovered sign of mischief was a diminution in its size.* The axillary glands were not enlarged.

In February, 1863, the disease had made no progress. The general health much improved (by attention to diet, &c.). Four years afterwards, March, 1868, this note was made—"Has seldom had pain, but if the arm be used pain comes in the muscles. The breathing latterly has been asthmatical, and a month since she had difficulty of breathing and faintness; cannot bear pressure below the ribs. If not careful in putting the feet to the ground, cramps immediately come on. There are yellowish red *plaques* about the skin over the breast, and some axillary glands are indurated."

In November, 1872, the patient wrote to me, saying—"There is a very large deep hole" (in the breast) "which discharges profusely . . . I have been feeling very unwell the last fortnight; . . . sometimes the pain is intense. . . . In the morning I feel very faint if I attempt to move in bed." Yet, notwithstanding, in April, 1874, the patient was still alive, but I was informed by letter, from a daughter of the patient, that she was "getting much worse" . . . "the arm is excessively hard and swollen, with intense pain, particularly in the hands and fingers." Death did not take place until early in the following year, the disease having lasted about fourteen years.

7. *General Cancerous Infiltration following in less than twelve months after Amputation of left Breast—Death within seventeen months after discovery of Primary Tumour—Disease in right Breast.*

Hannah Godfrey, schoolmistress, æt. 55, admitted into the Middlesex Hospital, March 18, 1878. In the left pectoral region, the breast having been amputated, is a linear cicatrix in a deep groove made by the swelling of the tissues around. The integuments from the clavicle downwards are thickened and firm, with a slightly reddened skin surface; the induration extends into the axilla, and even beyond. The left arm and hand are swollen. A large mass fills the axilla. The right breast is consolidated, hard, and nodulated; the

nipple is flattened. The respiratory movements are impeded by the rigidity of the chest-walls. The patient is not emaciated. Intense pain, dyspnœa, and progressive debility are prominent characters in this case. Fifteen months previous to admission the patient discovered a lump in her breast the size of a pigeon's egg. It increased, and the nipple became retracted and the skin indented. In August, 1877, the breast was amputated by Mr. Brook, at the Lincoln Hospital. The wound healed in five weeks, *but pain continued*. In November a small nodule, not larger than a pea, near the scar, and the condition of brawny induration as above described, appeared.

The tumour thus was discovered in January, 1877 ; the operation was performed in August; the secondary infiltration commenced in November. Death took place May 5, 1878.

Post-mortem.—Body well nourished, much subcutaneous fat in thoracic and abdominal parietes; marked œdema of left arm and hand.

In the left mammary region is a deep cicatrix. The skin in the neighbourhood much infiltrated with cancer; left axillary glands large and cancerous, and fused together in a mass around the axillary vessels. Right breast the seat of scirrhus cancer. The left pleural cavity contained nearly two pints of dark amber fluid; the lung, collapsed, lay against the spine. The right lung, 19 oz., covered with recent lymph, presented red hepatization of its lower lobes; left lung, 8 oz. Both lungs were studded on their pleural surfaces with opaque white, flattened nodules. Heart, 8½ oz., pale, soft, flabby; liver, 47½ oz., markedly fatty; spleen, 3½ oz., soft; kidneys, pale, soft; right kidney, 3 oz.; left kidney, 3½ oz.

8. *Acute Cancer of Breast, simulating at its onset Acute Mastitis.*

Extract from paper read at Clinical Society.—"Ann Doughton, æt. 45, single, a well-nourished woman of healthful aspect, admitted into the Middlesex Hospital, February 1, 1877, having in the right mamma a large, hard, smooth mass occupying the lower half and extending on the inner side to above the level of the nipple. The appearance of the skin covering the swelling was natural though tense

and ruddy. The nipple was somewhat flattened, but not retracted; the nipple of the left mamma having the same peculiarity. There was no great degree of tenderness except at one point, but a greater elasticity was felt at the outer side of the nipple than at other parts.

"Hitherto the patient had enjoyed good health. Her parents were living, and other members of her family were healthy; there was no history of cancer, nor had the patient lost flesh. About the middle of December, 1876—that is, six weeks before admission into the hospital, she accidentally had received a blow on the breast now affected from the elbow of another woman. No pain or bruise immediately followed; a week afterwards, however, whilst in bed, she felt a slight pain in the lower part of the breast, and then found a small lump, described as being of the size of the tip of the patient's finger. For about a month the lump did not increase and was not very painful, but later the enlargement was rapid and the pain became severe.

"On admission the pain was described as being 'heavy;' the patient was sleepless, without appetite, but had experienced no rigors. To all appearance the patient was suffering from acute mastitis. It is perhaps needless to say that mercury, belladonna, opium, quinine, leeches, ice, availed nothing. The patient being placed under the influence of ether, I made an exploratory puncture with a long narrow-bladed knife without result. Menstruation occurred once after admission into the hospital.

"In the early part of April (8th) there was some superficial ulceration, and tubercles of cancer appeared in the skin over the external side of the breast; by June 1, infiltration had extended far beyond the limits of the breast, the whole of the right upper extremity had become tense and swollen, and the pain was constant and excruciating. Death took place on June 15.

Post-mortem (by Dr. Findlay).—"The body was very slightly emaciated; right arm œdematous from the shoulder. The whole mamma was the seat of hard cancerous deposit, on section firm and bloodless; the gland was adherent to the subjacent structures; the axillary glands were enlarged and hard (as were also the axillary

glands of the opposite side). The right lung was adherent throughout its whole surface to the chest-wall and diaphragm. It was œdematous, and the bronchial mucous membrane was injected and thickened. The left pleural cavity contained sixteen ounces of turbid yellowish fluid, and the pleura, visceral, and parietal, was coated by a copious deposit of recent lymph. On the surface, at the base of the lung, were several flat greyish patches of apparently cancerous (?) material. The parenchyma and the bronchial mucous membrane of the left lung were in a condition similar to that observed in the right lung. The heart was soft and pale; liver, large, pale and greasy."

9. *Tumour of Breast—Amputation—Secondary Disease as blood-cyst near cicatrix, and subsequently hæmorrhagic cystic disease in axilla, and in lung—Family History of Phthisis.*

Elizabeth Tuffin, æt. 50, admitted March 19th, 1869. State on admission, quoted from ward card. "At the anterior fold of the axilla is a hard mass deeply ulcerated in the centre, from which there is a sanguineous discharge. Patient sleeps fairly without sedative."

Nearly two years previously, June 18, 1867, I had, with the assistance of Dr. Slight, of Clifford Street (under whose care the patient then was) removed at the patient's residence, 20, Marshall Street, the right breast, which was the seat of carcinoma. About a year subsequently a small, freely movable, spherical tumour, the size of a hazel-nut, formed, an inch to the axillary side of the cicatrix. This I removed by a simple incision, and it apparently was a single unilocular *blood-cyst;* but in October, 1868, my patient complained greatly of pain and of an enlargement at the anterior fold of the axilla, evidently secondary disease in the axillary glands. Ulceration took place, producing a hæmorrhagic sore, and she was admitted as above-stated into the hospital. The discharge was extremely copious and offensive. I employed locally tannic acid in solution, tincture of iodine, bichloride of mercury, acetate of zinc, tincture of secale, acetate of lead and chloride of zinc, sulphurous acid, trisnitrate of bismuth, lotion of nitric acid (one part to forty of water), lotion of

carbolic acid (one part to twenty), all with little or no definite advantage, either in arresting the bloody discharge or abating the fœtor. Towards the end of June the patient began to complain of a troublesome cough, and she died July 16th, 1869, four months after admission.

Patient, third child of eleven in family. One sister æt. 28; one brother, æt. 22; one brother, æt. 40, died of consumption.

Post-mortem. No. 84, Register.—"*Carcinoma right mamma and axillary glands; large cancerous growth of partially cystic character in right lung.* Body much emaciated, œdema of lower extremities. There is a large open ulcer with ragged edges and surface, extending from the late seat of right nipple to the posterior border of axilla. It is of a dark colour and offensive odour; the ulceration extends deep into the base of the neck and beneath the skin as low as the sixth rib. Axillary glands all enlarged. Right pleura almost universally adherent by firm bands to the wall of the chest; at the apex of the right lung are old cretaceous masses, and the lower lobe, in its central half, was filled with cancerous deposit breaking down. The left lung healthy, as well as the other organs, which were pale in colour. The uterus contained a large fibrous tumour in its walls. Weights of the organs: heart, 7½ oz.; right lung, 20½ oz.; left lung, 9½ oz.; liver, 41 oz.; right kidney, 4 oz.; left kidney, 4 oz.; spleen, 3½ oz."

10. *General Infiltration of Tissues of Pectoral Region after two operations for what appeared at the time to be a non-malignant Disease of Breast—Extensive lymphatic Disease of Abdomen and Cancer of Intestine.*

Ann Crawford, æt. 44, was operated on by me in the latter part of the year 1876, for what appeared to be a mammary tumour: the wound never satisfactorily healed, a small sinus remaining, and some induration existed. She was re-admitted, August 18, 1877, and my colleague, Mr. A. Clark, taking charge of my patients, removed the whole of the breast, and she was discharged convalescent, September 27, 1877. A note made by the Registrar was to the effect that a single

smooth walled cyst only was found in the removed parts. The patient continued to show herself to me at the hospital, and soon began to complain of severe pain in the arm and shoulder. She was eventually re-admitted into my cancer ward; the real character of the induration having become too evident: she continued to suffer extremely, and died March 12, 1878. At the time of the operation I had no doubt of the "innocent" character of the tumour, nor were our suspicions aroused until the œdema, sclerosis, began to extend.

Post-mortem.—"*General appearance.*—Fairly well nourished; left arm œdematous, with a hard brawny œdema, which extends also over the left half of the chest; left lower limb also œdematous. A deep, puckered, radiating cicatrix occupies the left mammary region, and extends into the axilla. On the right side is a hard nodule the size of a chestnut, in the upper part of the mammary region above and to the outer side of the nipple; whilst a large indurated gland can be felt in the axilla adherent to the skin. Other nodules scattered in various parts of the skin of the thorax. The right breast is for the most part atrophied and replaced by fat; imbedded in its upper part is the hard nodule referred to; it is fibrous and glistening on section, except in the centre, where it is opaque and yellowish. The right axillary glands are firm, white, and glistening, and adherent to the skin, to one another, and to the subjacent vessels.

"On dissection, the tissues of the left side of the chest are found sodden with œdema. The pectoral muscle is pale and atrophied and 'wet;' whilst interspersed among its fibres are nodules and bands of opaque white cancer. Above, the infiltration becomes general; in the subclavicular and upper axillary regions, the vessels and nerves occur firmly imbedded in and concealed by tough, fibrous new growth. The left pleural cavity is filled with a quantity (four pints) of dark, straw-coloured fluid. The left lung, entirely airless, lies completely collapsed against the spine—its texture extremely tough and uniformly black throughout. On the right side there are numerous fibrous adhesions between the lung and chest-wall; the lung, intensely gorged with blood and

very pigmented, contains no nodules of cancer. Pericardium natural; clots in both sides of the heart, which is much overladen by fat; the muscular substance tolerably firm; valves healthy.

"Abdomen: in the right lumbar region a rounded tumour, the size of a fist, was seen lying behind the peritonæum and displacing the cæcum and ascending colon inwards, to which it adhered. This proved to be the upper extremity of the displaced right kidney, which was firmly fixed in this abnormal position, so that the surface, usually posterior, had come to be perfectly horizontal and uppermost. It was nowhere in contact with the liver; besides its adhesion to the large bowel, it was further firmly adherent to the second part of the duodenum; whilst by its hilus it was fixed by a mass of cancer, continuous with cancer met with in the mesenteric glands (*vide infra*). The mesenteric glands formed a large nodulated conglomerate mass, intersected by masses of adipose tissue and bands of white scirrhus material. Small intestine: the peritoneal surface of the greater parts of this intestine presented a striking appearance from the infiltration and distension of lacteal vessels. These extended as opaque white lines, of the size of whipcord, from the mesenteric glands to each surface of the bowel, where they appeared as beaded strings and filaments, breaking up into a fine network on each side of the bowel. The larger lymphatics accompanied the arteries and veins; but they did not follow all their divisions. Some of the most marked of these distended lacteals occurred in the duodenum; but they could be seen at intervals at different parts of the ileum. About the middle of the ileum some hard white nodules, of the size of a pea, were met with at the attached border of the bowel, a few involving the whole thickness of the coats appearing on the mucous surface. About 39 inches from the ileo-cæcal valve the bowel was encircled by a hard white mass of new growth, shaped like a signet-ring, the widest part of which ($\frac{3}{4}$ inch) was depressed in the centre. Internally the gut was narrowed extremely, not admitting the tip of the little finger, with raised margins, and in the vicinity several small nodules; a few other nodules occurred lower down the ileum. Large intestine: the large bowel

was free from cancer; there was no increase in the lymphatic structures of the intestinal mucosa. The stomach and duodenum were adherent to the pancreas, and this again to the mass of mesenteric and retro-peritoneal glands, which formed a dense mass investing closely the aorta and vena cava. Some dilated, but not beaded, lymphatics were seen on the surface of the stomach. Right kidney was very large, especially the anterior (or upper) end, which was much discoloured; and on stripping off the capsule the whole surface was seen thickly studded with opaque white and yellowish-white prominences, the size of a pin's head, some softened and purulent. On the upper surface there were two opaque nodules close together, the largest being of the size of a nut. On section, the whole organ, both in its cortical and medullary parts, was marked by opaque lines, corresponding to prominences on its surface. The pelvis and calices were dilated, and full of turbid urine. Left kidney presented the normal red colour on the surface, which was smooth. The organ was of large size, and 'wet' on section. Ureter not dilated; bladder contracted; uterus retroflexed, and fixed by firm adhesions to surrounding parts. On left side a group of inguinal glands surrounded the femoral vein, which was blocked by a firmly adherent thrombus. Spleen soft; liver large and firm. No secondary nodules; nor were any cancer nodules met with in the general peritoneum.

"Weight of organs: heart, 10½ oz.; right lung, 20 oz.; left lung, 8½ oz.; liver, 58 oz.; spleen, 7½ oz.; right kidney, 8½ oz.; left kidney, 7 oz."

11. *Chronic Cancer of Breast—Repeated Necrosis and Cicatrization—Special Warty Condition of Skin commonly found in Epithelioma.*

(*Extract from Paper read at Clinical Society.*)

M. A. Hepworth was admitted into the Middlesex Hospital November 12, 1873. Dressmaker; æt. 72; single. The Registrar has made the following notes:—"Two years previously the patient noticed a lump in the right breast just above the nipple, which gave no pain. It has slowly increased, and at times is painful. For the last

six months it has been tender. The tumour is movable and circumscribed, about the size of a duck's egg. *There are no enlarged glands in the axilla.*

"The patient is a small, shrivelled woman, with a brownish skin, which is studded with lenticular freckles, such as are commonly seen in those who are suffering from epithelioma, and which, on close examination, appear to be sessile warts. I advised the removal of the tumour, but the patient declined to undergo any operation.

"The case has thus, at the present date (January, 1878), been under observation during rather more than four years; the patient's general health and condition are much the same as on admission. At times there has been a greater degree of debility than usual. After about a year of residence in the hospital the tumour inflamed, and then an axillary gland became enlarged; subsequently superficial ulceration occurred, but this healed. In May, 1876, the patient complained of much pain in her limbs, and her appetite fell off. In April, 1877, the centre of the tumour sloughed out; the surface of the resulting hollow, however, became covered by a delicate cicatrix. In January, 1878, about a third of the circumference of the remaining mass sloughed in a similar manner; at some points again, the same delicate cicatrization is showing itself.

"The patient has now (January, 1878) been in the Middlesex Hospital four years, and is 76 years of age. The excessive weakness and anorexia have passed away, whilst the tumour itself has but slowly increased; it has undergone two acute attacks of necrosis. The condition of the axillary gland (or glands) remains nearly unaltered. There is no swelling of the arm. As regards family history, the patient's mother died of phthisis, æt. 32; her brothers and sisters were all sickly, and died young."

The patient lived until December 15—that is nearly a year after the above report of her case was read at the Clinical Society—gradually increasing debility was the only noticeable special feature in the progress of the disease.

Post-mortem.—Examination made by Dr. Lyell, December 16,

1878.—The examination was made twenty-nine hours after death. "*Rigidity*, well-marked ; *General appearance*, body small and much emaciated. Scattered over the skin, chiefly of the abdominal wall, were a number of darkly pigmented (some quite black) sessile warty excrescences, for the most part very small, and many not larger than, or so large, as a pin's head. An excrescence of this nature and appearance filled the umbilical depression. The right nipple and the greater part of the right mamma had been destroyed by an ulceration, of oval or somewhat reniform shape, and with its long axis horizontal measuring about $3\frac{1}{2}$ inches. The central part of the base of this ulcer was deep and covered by a dark, offensive fluid, which, when washed off, revealed a discoloured sloughing surface beneath. The margin of the ulcer was raised, rounded, forming a wall of infiltration, having an almost uniform thickness in its entire circumference. This wall was about 3 inches thick, its surface of a dry, brownish colour, not ulcerated, and associated with patches of recent epithelial formation, which extended for short distances and irregularly on to the base of ulcer, exhibiting attempts at repair confined to the more peripheral and superficial part of the ulceration. The skin of the chest-wall beyond the raised margin of infiltration was natural ; but quite at its outer extremity, which extended as far as the anterior wall of the axilla, immediately behind the lower margin of the pectoralis major, was an enlarged gland, fixed, ovoid, and apparently, almost immediately connected with the primary ulcer, and merely separated from it by a narrow bridge of non-infiltrated tissue. The ulcer was firmly bound down to the front costal wall beneath it. Below the clavicle some enlarged glands were to be felt externally.

"On reflecting the skin and ulcer from the chest-wall, the whole of the deep tissues, corresponding to the cancerous ulceration, were infiltrated, and rendered rigid and inflexible by a firm, whitish, cancerous, plaque-like mass, destroying the pectorals; at one spot corresponding to the fourth interspace the knife passed through an extension of the growth, where it had invaded the tissue between the ribs and destroyed both intercostals at this point. The ribs above

and below were intact, and the parietal pleura here retained its natural aspect.

"The axillary vessels were found to be partially surrounded at the upper part by a cluster of three or four enlarged glands; these chiefly lay along the artery, and almost hid the origin of the acromio-thoracic artery. The vein was not encroached upon, the limb below presenting no trace of œdema. More deeply in the axilla was a single large infiltrated gland, about the size of a small walnut, adherent to and continuous with the primary growth. The opposite axilla contained a small gland about the size of a small bean, which did not appear to be infiltrated with cancer.

"Thorax.—Both lungs were adherent in places to the costal wall. They were shrunken, small, and retracted towards the posterior wall of the cavity. When removed, it was seen that the pleural surfaces of both were universally studded with small raised white plaques of cancer. These mostly implicated the pleural and subpleural tissue only, but in other places extended a short distance into the superficial texture of the lung. They appeared to be scattered indiscriminately over the pleural surface, were not more than two-thirds of an inch in thickness, mostly small and discrete, but in other places by coalescence forming more extended flattened white plates. The costal pleura was infected in a much less degree, and the anterior mediastinum showed no trace of enlarged glands or cancerous deposit. The pleural cavities contained a small quantity of serous fluid.

"The (general) condition of the lungs was that of atrophous emphysema, the lungs being small and deeply pigmented, but almost entirely free from cancer, one or two small rounded nodules only being discovered in their substance close to surface.

"Pericardium empty.—On removing the heart, the large veins were found distended with blood; both auricles contained loose, dark, post-mortem coagula, which extended through the auriculo-ventricular opening into the ventricles, somewhat small in size; left ventricle contracted, and its walls markedly hypertrophied, the muscular tissue being of a healthy, natural colour.

"Abdomen, no fluid in peritoneum.—Liver small, congested, slightly 'nutmeggy,' contained three nodules of secondary cancer. These were imbedded in the substance of the lobe, rounded in shape, of firm white structure, and about size of marbles.

"Kidneys; both granular, capsules peeled with difficulty—adherent; cortex diminished. Spleen normal."

Dr. Lyell made microscopical sections of the breast, and also some drawings of the appearances, which admirably illustrate the alveolar arrangement seen in scirrhus: no doubt as to the true nature of the disease in this case can therefore exist.

12. *Chronic Cancer of Breast—Anomalous Alterations in Appearances—Gain in Weight.*

Miss G——, æt. 45. Sent to me by Mr. Shepherd, of New Cavendish Street, January 19, 1876, with scirrhus of the left breast. The whole gland was solidified, and the nipple was retracted, as well as the skin immediately surrounding. The axillary glands were hardened and distinct. Three years since she had a blow on the breast; the patient was anæmic, and suffered considerable pain. She was left-handed.

I made from time to time the following notes:—

April 11, 1876.—The breast is more nodular.

November, 1876.—The breast is more movable, and feels to the touch more cystiform. The patient has gained 14 lb. in weight, being now 8 st. 10 lb., and measures $2\frac{1}{2}$ inches more round the waist; she complains of much pain in the loins and back, preventing quick walking; has hæmorrhoids. I examined the abdomen to ascertain if the liver were enlarged; but could detect nothing abnormal.

May, 1877.—Condition about the same.

June 23, 1878.—The tumour of the breast is diminishing; *menstruation ceased last December.*

May 25, 1879.—Axillary glands no longer distinct; the central depression of the breast remains. Patient complains of pain in lower part of back and at the back of the left side of the chest. She

has grown very stout; suffers from "heats and flushes." Has been working hard as milliner daily from 7 a.m. to 10 p.m.

September 29, 1879.—Has lately had much pain and aching from shoulder to elbow. The arm does not swell; pain generally worse at night; weight, 9 st. 12 lb.

December 24, 1879.—Has severe cough and pain in the side, but proposes to visit friends in the country during Christmas holidays.

May, 1880.—Seen by me. November, 1880.—Died in Cancer Hospital. Dr. Newcome W. Bourns, the House Surgeon of the Hospital, obligingly informed me that the patient died suddenly, having "well-marked signs of intrathoracic deposit, but no post-mortem examination could be made on account of the friends refusing permission."

13. *Chronic Cancer—painless—Death from Cardiac Degeneration.*

Mrs. M——, æt. 73; first seen by me 19th September, 1877; had small tumour to the sternal side of the nipple. It had existed between three and four years; the nipple was somewhat enlarged. The patient complained of no acute pain, in fact of very little pain of any kind in the breast, but suffered much from cranial neuralgia on the right side. No enlarged glands in the axilla.

April 18, 1878.—The patient reports herself to be in the same condition as in September last. There is a slight depression of the surface a little above the site of the tumour.

October 26, 1878.—There is no discomfort; the cranial neuralgia has gone.

April 30, 1880.—The depression of the surface noted in April, 1878, has increased, so as to form a distinct sulcus. There is very little uneasiness, and the axillary glands are not enlarged.

October 18, 1880.—There is an erythematous superficial thickening at several points around the centre of the breast, and the same appearance on the chest below the mammary region. The patient complains much of dyspnœa, which I could not discover to be other than cardiac. There was no indication of hydrothorax, but symptoms

of aortic degeneration and feeble heart. During a visit to the country during July and August the patient suffered much from rheumatic (?) pain in the shoulder, scapular region, and back, and experienced great muscular weakness."

November 10.—I was informed that the patient died November 8; from increasing feebleness and cardiac failure. This patient's father died æt. 80, her mother æt. 84.

14. *Chronic Cancer of the Breast—History of Operation—Necrosis of Secondary Deposit—Cicatrization of Ulcer—Spinal Symptoms which in great measure disappeared.*

(*Extract from Paper read at the Clinical Society.*)

"Ann F——, spinster, æt. circa 41. First came under my notice July, 1868, at the Middlesex Hospital, Cancer Out-patient Department.—There was on her left pectoral region a scar resulting from an operation for the removal of a tumour from the breast, two or three years previously, by Mr. Henry Smith, at King's College Hospital. The scar ran obliquely upwards and outwards. The patient stated that a part only of the breast had been removed with the tumour. There was induration of some of the axillary glands and of the contiguous tissues, the mobility of the arm being thus impaired. Along the margins of the scar, which was superficially ulcerated, were some yellow-red tubers about the size of hazel-nuts, rather dry and rough than shining and vein-marked. The patient had discovered the original tumour two years before Mr. Smith's operation; therefore the disease, at the date of her application at the Middlesex Hospital, already had existed at least four years. The recurrence of the cancer took place, I believe, about twelve months after the operation —on this point I cannot, however, speak with complete confidence. The patient continued as out-patient during two years, the tubers at the upper margin very gradually increasing and merging into an oblong protuberance overhanging the scar. The noticeable facts in her history during this period were: A fall in October, 1869, which shook her a good deal, and appeared to aggravate her ordinary

discomfort; the healing of the ulcerated surface of the scar in January, 1870; and an increased painfulness of the affected parts in March, which continued, and determined her admission as in-patient in June following. Her condition at that date is thus noted in the Cancer Register (vol. x., case No. 8):—

"In the cicatrix running from the seat of the breast backwards and upwards to the anterior fold of the axilla are several roundish, hard, granulating nodules; the tissues are puckered, and in the surrounding skin are some small, hard, red, marble-sized nodules, some of these quite low down on the left side; some smaller pea-sized swellings in front, and one as low down as the end of the second piece of the sternum. There is tenderness over the liver, but no nodules or enlargement could be detected."

We have now reached the sixth year of the duration of the disease.* I found, further, on the patient's admission, an undue dulness of the lower part of the thorax on the right side. About the middle of July there was so much pain in the back that the patient could neither raise herself nor turn in the bed. By the middle of August the mass at the upper border of the cicatrix had inflamed and become gangrenous; it sloughed cleanly out, and the sore gradually healed, and remained sound for the rest of the patient's life. In October there was a numbness and motor paralysis of both legs. In November the tongue became "beefy," and the paralysis continued. In February, 1871, my colleague, Dr. Henry Thompson, diagnosed "extensive pleuro-pneumonia of the left lung, occupying nearly the whole of it." But by July 18 the patient had so far recovered health and strength as to be able to walk across the ward. In October the left side of the thorax was found to be dull. In November she suffered much dyspnœa and cough. In January, 1872, she complained of great pain in the right shoulder, and in April of pleuritic pain in the *right* side. In July diarrhœa

* I may mention that the Registrar noted that the first observation of a tumour by the patient herself was eight years before her admission into the hospital.

threatened to be troublesome, but was checked by sulphate of copper and opium. On August 13th the abdomen was tympanitic and tender, the tongue coated in the centre, the breathing somewhat laborious. P. 104, R. 34, T. 97°. There was evidence of fluid in the peritoneal cavity, and of enlargement of the liver, over which organ a friction or crepitation could be felt; and there could be also felt a nodulated condition of its surface; the urine, tested with nitric acid, gave the bile tinge. The temperature up to the date of the patient's death on August 27, was observed daily, but it never exceeded 98·1°. The above are the salient epochs in the patient's history. From time to time there were developed in the skin around and about the cicatrix small shining tubercles, but, what was remarkable, individual tubercles wasted away and almost disappeared. Mr. De Morgan was so good as to look at the case occasionally, and especially noticed this fact.

The *post-mortem* examination was made by Mr. Morris, and the following is an extract from No. 66, vol. ii., P.M. Register, 1871–72:—

"The left arm was tightened to the side of the trunk by a mass or group of nodules of deposit; the deposits were found, for the most part, to extend no deeper than the cutis; in one or two spots only was the fascia covering the intercostal spaces involved. There were nodules of cancer on the inner aspect of the fourth and fifth ribs and on the *outer* aspect of the eighth rib of the right side; this last-named deposit involved the proper structure of the rib itself; the upper part of the manubrium sterni was also the seat of deposit. There were no deposits of cancer in the lungs. The left lung was small, splenified, and inelastic, and firmly adherent to the chest-walls: this lung weighed 11½ oz., the right lung weighing 17 oz. The liver weighed 7½ lb., and was studded with innumerable cancer-deposits; around the circumference of each was a bright yellow border of liver-tissue, and in the centre of some, on section, was seen the open mouth of an hepatic vein. The liver reached on the right side to the third, and on the left to the fifth intercostal

space; downwards it extended below the umbilicus. Twenty ounces of serum were taken from the peritoneal cavity. The spleen was normal, its weight 9½ oz.; the kidneys also normal. The uterus contained fibroids, one of which was calcified."

15. *Chronic Cancer of the Breast—Brawny Condition of Skin of Chest—Œdema of the Arm—Effusion into Pleura—Family History of Cancer.*

Harriet Adams, æt. 48. Admitted under my care March 27, 1869. No. 168, Cancer Register, vol. viii. "Five or six years ago the left breast swelled and became painful. The nipple subsequently became retracted, and the skin broke nine months since. The site of the left breast is occupied by a cluster of tuberculated and ulcerated projections in the skin, the size of split peas and somewhat larger. The nipple is gone; there is a cluster of enlarged glands in the axilla." The affected breast was always the larger of the two. In June the arm began to swell, and she died with effusion into the pleura, October 22, 1869.

There is a curious circumstance in the family history of this patient. One of her sisters, at the age of 20 years, had a tumour, about the size of a nutmeg, removed from the left breast. Twenty years later a cancer formed in the same breast, which was cut out at the Radcliffe Infirmary, Oxford, in 1846. . . . . A paternal aunt died with cancer of the stomach, and a maternal uncle with cancer in the throat.

Post-mortem.—Body very pale, but nearly two inches of fat in the front of the abdomen; occupying the site of the left breast is an extensive shallow ulceration, with thickened hard edges and adherent below, the hard deposit extending four or five lines beyond the actual limit of the sore; there are, besides, some separate hard deposits in the skin in the neighbourhood. There is a brawny condition of nearly the whole skin over the left side of the chest reaching across the sternum: on cutting into it, it is seen to be two or three lines thick. The tissues about the axilla are all infiltrated with a firm dense deposit, and the arm is very œdematous. The cancer has extended as a very hard,

white-looking deposit through all the tissues in front of the left side of chest, but without reaching into the pleura. Forty-five ounces of clear, straw-coloured fluid in left pleural cavity, the lung quite collapsed. Embedded in the lung are three or four pea-like nodules, one of which is white and dimpled on the surface; the others deeply pigmented; the right lung universally adherent and charged with serum. The heart has a rigid and thickened mitral valve, admitting one finger only; thickening of the chordæ tendineæ and auriculo-ventricular opening; some enlargement of the bronchial glands, which are deeply pigmented. Liver slightly cirrhosed, and containing some half-dozen umbilicated white firm cancer nodules like peas. Spleen normal. Kidneys slightly granular, and containing a few small cysts. Uterus small, smooth, os almost obliterated; attached to each ovary are cysts, one the size of a tennis-ball, on the right ovary. The Fallopian tube is adherent, and two or three small cysts are contained in the left ovary. Weights of the various organs —heart, 9 oz.; right lung, 17½ oz.; left lung, 7 oz.; liver, 39 oz.; spleen, 4 oz.; right kidney, 3½ oz.; left kidney, 4 oz.

16. *Chronic Cancer of the Breast—Bruise of Primary Tumour followed by its rapid increase in size—Tendency to Cyst Formation—Sloughing of part of Tumour—Cicatrization of Ulcer.*

Ann Cowan, æt. 73. Admitted out-patient, July 9, 1860. "Five years previously she noticed a lump, which she thought was a 'core of milk,' which three years since was accidentally bruised while attending at an Eye Hospital, and rapidly increased from that time. Pain is not great, only now and then severe. Wet weather gives rise to the pain; there is no axillary or cervical glandular enlargement. Its removal advised, but patient would not consent to operation."

October 20, 1860.—"Tumour has increased; it is nodular, and the nodules looking like the protuberant walls of cysts, with a whitish transparency. The patient finds that glycerine allays the surface irritation better than any other application."

December 3.—"Not quite so well; tumour appears to be approaching the surface."

December 31.—"Tumour enlarging rapidly."

January 14, 1861.—"Patient says that itching is her chief discomfort as regards the breast."

March 18, 1861.—"A cyst on the surface burst a few days since; some whitish, cheesy matter escaped."

March 25.—"Cyst aperture nearly healed; breast is easier."

June 10.—"No open sore; suffers little."

July 1.—"Tuber (or nodules) becoming more prominent; much pain in the shoulder."

September 5.—"Pain less, tubers increasing; the breast is still movable."

December 5.—"Another cyst appears to be coming forward."

January 2, 1862.—"On the whole, comfortable; little change."

June 26.—"Tumour is shrinking. Patient says it has bled, but there is no ulceration visible."

October 16.—"I carefully examined the patient to-day. No axillary or supra-clavicular enlargement. She appears much as usual."

December 4.—"Tumour contracting."

January 22, 1863.—"Patient about the same, tumour contracting in parts; late stormy weather caused great pain."

[Patient says that she is so sensitive to disagreeable odours that the smoke of a candle snuff once made her miscarry! and that her mother was similarly sensitive, so that she could not bear flowers in her room.]

March 26.—"Tumour shrinking. Patient has more pain, of a smarting and aching character. She sleeps well. There is one circular, yellowish, dry depression on the surface of the tumour."

December 8, 1863.—"There is enlargement of the axillary glands. Patient to be admitted into the Cancer Wards of the hospital."

Admitted in-patient.

State on admission.—"There is a tuberose enlargement of the right breast. She has been out-patient since July, 1860. The disease commenced nearly eight years before her admission. There appears

to be an inclination to the formation of cysts near the surface, which burst and bleed. An axillary gland enlarged; arm is not swollen."

January 1, 1864.—"A cyst burst and there was much bleeding."

January 5.—"Necrosis of the tumour to about half its thickness took place."

January 19.—"Complained of great irritation of the vulva."

February 12.—"It was necessary to draw off urine by catheter, night and morning."

The patient lived on with little change in the breast—and—

Died, December 8, 1865.—"There were secondary deposits in the lung, and effusion into the pleural cavity."

17. *Chronic Cancer of Breast—Twelve Years' Duration.*

Eliza Williams, æt. 54. Admitted May 29, 1866. No. 112, Cancer Register. State on admission.—"Left breast scirrhus, nipple retracted, enlarged axillary glands, left eye more prominent than the right. Numbness of the left hand. Two years before admission she began to feel pain in the left breast, and the nipple became retracted; the pain in the breast increased up to the time of her coming to the hospital."

On November 9th "the tumour was injected with acetic acid at my request, by the physician himself who recommended its employment in cancer. The pain immediately caused was excessive, and continued more or less severe for some days afterwards."

November 30.—"No diminution of the tumour."

December 22.—"Tumour no smaller; it has not again been injected."

January 22, 1867.—"Feels a sensation of pressure in the affected breast; can sleep only when lying on the right side."

March 22.—"Suffers much pain from a sense of pressure, as though something tight were bound round her. Breast has been slowly increasing in size, and has ulcerated (small yellow ulcerations)."

April 23.—"Breast bled a little; is reddened and painful, but pain is worse round the shoulder."

This patient continued to live on from year to year in "feeble health;" for several years she very gradually became weaker, and died March 6, 1878, twelve years after her admission.

Post-mortem. No. 6, Surgical P.M. Register. "General appearance, extremely emaciated. Left mammary region is occupied by a hard nodulated mass bounding a wide and deep sulcus, which extends in a curved direction downwards and outwards from the sternum to the anterior axillary fold. In length the sulcus measures 6½ inches; its widest part is at its anterior extremity, where it measures 2½ inches; while at its posterior extremity its transverse measurement is 1½ inches. This sulcus is covered for the most part by a thin bluish epithelial layer, but elsewhere it is covered by inspissated pus, and at one part, where it dips deeply beneath an overhanging tumour-mass, a surface of vascular granulations is exposed—it has much the appearance of an extensive cicatrix; the surrounding skin being puckered and drawn in towards the sulcus. The main mass of the tumour bounds this furrow above. It is excessively hard both to the touch and to the knife, cutting like cartilage. The posterior half of the cicatrix is bounded only by thickened skin. The whole of the cutaneous structures, with the tumour and soft and osseous wall of chest removed *en masse*. It was then found that muscular tissue was invaded by the growth, but very little exceeding the area of the mammary gland; a few enlarged and hardened glands occurred in the axilla.

"Pleura covered by small irregular white plaques; no mass in lung.

"Right lung so firmly adherent that it had to be cut out with knife; pleural layer changed into thick scirrhus mass, of cartilaginous consistence, with microscopical characters of scirrhus cancer: this invaded the whole lung.

"Diaphragm also covered by plaques of white hard cancer. No liver nodule; liver firm. Kidneys atrophied; spleen atrophied.

18. *Carcinoma Mammæ, complicated with Disease of Nervous System.*

Caroline Tree, æt. 56, came under my care November, 26, 1868. She had been operated on three months before for cancer of the right breast commencing two years previously, by Dr. Owen, East Farley, Kent. There was a horizontal cicatrix above the line of the nipple. The disease had returned, and on the day that she was to be again operated on at King's College Hospital, a few weeks before coming to the Middlesex Hospital, she had an epileptiform seizure, and the surgeon declined to treat the case. She was the youngest of twenty-two children; was a remarkably healthy-looking person; hair *quite free from greyness;* but the skin over the shoulders was marked by numerous brownish, sessite warts.

Father died of apoplexy at 75.

Patient was admitted into the hospital, and I removed the remainder of the breast January, 1869; and she was discharged convalescent March 16; but died, April 24, with symptoms of brain disease.

Mr. Jonas King, of South Lambeth, was kind enough to write to me, giving the following particulars:—"I saw Mrs. Tree, March 19, three days after she left the hospital, when I found her in good spirits, without any bad symptom, wonderfully improved in health, with scarcely any remains of the wound, and apparently progressing most satisfactorily towards recovery. About a week afterwards I found her with her mouth very slightly drawn to the left side and complaining of loss of power in the right foot; the tongue was perfectly straight, and there was little or no perceptible difficulty in articulation, but want of power of expressing ideas or wishes. . . . The paraplegic symptoms increased, as well as the aphasia, though the retraction of the mouth disappeared. Latterly she had long comatose sleep, extending sometimes to twelve hours or more, from which it was very difficult to arouse her. She had want of power in deglutition, fluids finding their way into the trachea and causing cough, while she could not swallow solids at all. She

gradually sank, and died 23rd April, having been quite comatose from the 20th."

*Progress after operation.**—"January 13th—Sick after chloroform. 14th—Rigor (?) 6.45 a.m.; pulse small, irregular and intermittent; a good deal of oozing. 9.30 a.m., pulse 121; has been sick; has had a little sleep. 3 p.m., pulse 132; ordered brandy, ℥viii. 10 p.m., pulse 128; occasional delirium. 15th—10 a.m., pulse 126; slept during the night; slight redness above the wound. 10 p.m., pulse 120; discharge from wound rather offensive. 16th—10 a.m., pulse 104; a good deal of pain; bowels have not acted since operation; much nausea; but slept fairly during the past night. 10 p.m., pulse 104; discharge from wound offensive. Inj. morph. hypodermic. 17th—11.30 a.m., pulse 108; slept; wound discharging freely; not so offensive; bowels still constipated. 5 p.m., pulse 104. 9.45 p.m., pulse 112. 18th—Pulse 100; slept well after a morphia injection; discharge from wound offensive. ℞. Sodæ sulphite ℈i. aq. ℥ss. 2 hr. Wine ℥viii., brandy ℥v. Lot. acid carbolic. (Acid carbolic ℥iv., acid acetic dil. ℥iv., glycerine ℥i., aq. ℥xx.) 10 p.m., pulse 104. 19th—11.30 a.m., pulse 92; slept well; 'patient says she feels better;' discharge offensive. 19th—9.30 p.m., pulse 104. 20th—11 a.m., pulse 96; slept without morphia; discharge offensive; bowels not moved. 10 p.m., patient appears quite comfortable. 21st—Pulse 84; slept without morphia; fever less; bowels acted yesterday; discharge offensive. Lotio iod. (tinct. iod. co. ℥ss. acid nit. dil. ℥ss. aq. ℥xx.). 10 p.m., pulse 104; patient appears comfortable. 22nd—Pulse 80; slept well; tongue moist and clean; discharge less offensive; wine ℥iv., brandy ℥iv. 23rd—Pulse 84. 24th—Pulse 84; complains of pain in abdomen; bowels not moved. 10 p.m., enema communis. 25th—Pulse 112; tongue dry; thirst; discharge less; pain in abdomen continues; ℞. Tinct. opii ♏viii., ol. ricini ℥ss. 10 p.m., pain in abdomen continues. Pil. calomel c. opio, 6 hr. 26th—10 a.m., pulse 96; slept well. 2.30 p.m. ℞ Amm. carb. gr. v., tinct. opii ♏xii., tinct. cinchon. ℥i., decoct.

* From Dresser's Notes.

cinchon. ʒss., 3 hr. Empl. opii, 12in. by 12in. to abdomen. Brandy ʒiv. 27th—10 a.m., pulse 128; pain in right iliac region; sick; bowels have acted. Haust. potass. citrat. efferves. 10 p.m., sleeping. 28th—11.30 a.m., sleeping; pulse 100. 29th—Pulse 100. 30th—slept well; bowels have acted; pain less. 10 p.m., pulse 104; patient comfortable. February 2nd—11.30 a.m., pulse 92; slept well last night; bowels acted yesterday; appetite returned; thirst less; discharge from wound slight. 3rd—Pulse 100. 4th—Pulse 96. 5th—Pulse 88. 7th—Patient complains of cough. 9th—Brandy ʒv. 10th—Cough very troublesome; pulse 92. 11th—Pulse 100. ℞ Acid hydrocyan. dil. ♏iii., tinct. hyoscyam. ʒi., aq. ʒss., 4 hr. 12th—Pulse 100; cough less. 20th—Pulse 120, irregular; somewhat delirious. 21st—Pulse 108. 22nd—Pulse 110. 23rd—10 a.m., pulse 96; slept fairly; patient feels better. March 11th—Pulse 96. 16th—discharged convalescent."

19. *Cancer of right Breast—Amputation—Immunity from recurrence for over Two Years—Pleurodynia—Extension to opposite Breast—Cerebral symptoms—Tumour of Brain—Under observation Six Years—Total duration of Disease at least Eight Years.*

Eleanor Tibbs was first seen in November, 1863, as out-patient, then æt. 49. She was a domestic servant, single, catamenia regular, but suffered somewhat from dysmenorrhœa. In the summer of 1862 she discovered a lump, the size of a damson, in the upper part of the right breast. The tumour did not increase until the same season of 1863, when having worked hard (at scrubbing), it enlarged so as to have a diameter of about two inches. There were, however, no external appearances nor was any sensation communicated to the touch that would distinguish this tumour from a chronic mammary tumour. No enlargement of the axillary or of the supra-clavicular lymphatic glands could be detected, and the inconvenience from pain was but slight. The patient was of fair complexion, with very light grey eyes, rather deaf, and complaining of noise in the head.

1864. January 21.—"Patient thinks the tumour is smaller."

1864. February 17.—"Tumour believed to be increased in size."

March.—"No axillary enlargement; no retraction of the nipple."

March 17.—"Tumour rather larger. The weather affects it."

October.—"Tumour softer, and there has been some shooting pain."

I removed the tumour, including the whole of the mammary gland, by the ordinary operation.

1865. August 3.—"No local trace of return of disease."

October 12.—"Well."

November 23.—"A small lump at the inner possible limit of the mammary gland; character doubtful."

1866. January 18.—"No return of disease."

May 17.—"No return of disease."

November 9.—"Suffering with pleurodynia. Placed under the care of Mr. Moore in the Middlesex Hospital," where she remained some weeks.

1868.—Again applying as out-patient, March 12, it was noted that "the nipple of the left breast excoriates; the lump near the cicatrix of the right side is neither continuously painful nor puckered; it is movable; 'occasionally pricks and shoots.'"

April 23.—"Weak; 'want of appetite'; 'can't sleep;' 'can't draw breath.'"

1869. February 4.—"The nodule at the sternal side of cicatrix is becoming distinct."

April 1.—"The patient is much wasted; is constantly sick."

April 8.—"Is better; no longer sick (has taken half-drop doses of creosote)." Belly carefully examined; no tumour discovered. Seen on the 15th and 22nd. Nothing special to note.

May 6.—"Complains of giddiness."

May 20.—"Giddy."

June 24.—"Sick for two days."

July 1.—"'So feeble;' 'no strength.' Opposite nipple retracted; breast indurated; limbs ache."

Thus end my own notes of the case as out-patient.

Admitted as in-patient, under my care. The following are the in-patient notes :—

Eleanor Tibbs. No. 5, Cancer Register, vol. ix. Admitted July 5, 1869, under Mr. Nunn's care.

Has twice before been in-patient; four years ago was operated on; there was then a tumour on the upper segment of the right breast. Has lately been troubled with sickness; pain over the side of the head and down the arm; the arm does not swell. Patient is very deaf.

State on admission.—There is an old cicatrix in the side of the right breast, with cancerous induration of the tissues to its sternal side. The patient is extremely feeble, walks with difficulty, answers such questions as she can hear in a confused mumbling manner.

Progress.—The weakness increased; the patient often complained of throbbing in the head, the deafness and indistinctness of speech also increased. She seemed, however, to understand signs, and the tongue was protruded quite straight, with no definite paralysis; the difficulty of walking became continually more marked. In September there was noticed a central induration of the left breast. At this time the patient appeared almost fatuous, constantly wagging the head, and feebly smiling and mumbling inarticulate sounds when addressed; she died January 7th, 1870.

No relations known to have suffered from cancer. Father and paternal grandmother were reported to have died of asthma. Patient one of a family of fourteen, eleven being still alive.

Post-mortem. Register No. 132. January, 1870 :—"Scirrhus of mamma; old and recent secondary deposits in liver. Body rather emaciated. About one inch external to the ordinary position of nipple is an oblique scar three inches long, running inwards and upwards; its edges are not in the least indurated; a small mass remains, apparently of mammary gland, not connected with edge of cicatrix; this presents microscopically a mass of granular matter with large round cells. Axillary glands somewhat enlarged and indurated; on the left side, mammary gland hard and scirrhus, the neighbouring

structures of the mammary gland not affected. Right lung adherent at one part about three inches posterior to the right mamma, and the surface covered with a layer of pus; lung-tissue beneath, in a state of grey chronic interstitial induration, which extended to the bronchi; this induration involved about one-third of the lung-tissue, and appeared as if to spread to the bronchi. Lung was here indurated and non-crepitant; bronchi dilated, their mucous lining congested, and the tubes themselves full of muco-pus. The indurated structure was here and there slightly breaking down. Left lung was in a similar state to about the same extent. Both lungs on their surface were much puckered over these nodules, and were deeply pigmented. No appearance of cancer either on lung or pleura. Liver thickly studded with cancerous nodules of various sizes, from that of a pea to that of an apple; some were very hard, while others were beginning to break down in the centre. Spleen and pancreas healthy. Kidneys firm. Weights of organs:—heart, $8\frac{1}{4}$ oz.; right lung, 20 oz.; left lung, 13 oz.; liver, 50 oz.; right kidney, $4\frac{3}{4}$ oz.; left kidney, 5 oz.; spleen, 5 oz. *The brain was, at its base, the seat of a globular cancerous tumour the size of a raquet-ball.*"

20. *Cancer of Left Breast at early age, commencing during pregnancy with fifth child—Mastitis after birth of third child—Cerebro-spinal symptoms and excessive obesity.*

(*Extract from Paper read at Clinical Society.*)

Mrs. R——, æt. 27, the mother of five children. I saw Mrs. R—— first on the 23rd of April, 1872, only two months after her confinement with her fifth child. There was a tumour in the axillary lobes of the left breast, not well defined, and about the size of half an orange. This tumour she discovered in November, 1871—that is, at the seventh month of her pregnancy. After the birth of her third child she had suffered from inflammation of the affected breast, terminating by resolution, and she went through the next lying-in, in February,

1870, without trouble, and nursed her infant until it was nine months old.

At the date of her visit to me, for which I am indebted to the kindness of Dr. Saunders, of Hinde Street, the nipple was somewhat retracted; but taking into account her recent confinement and the obscure limits of the tumour, I was led to hope that it might be a simple inflammatory swelling of the axillary lobes of the gland. The patient was pale and weak. I consequently ordered her steel and cod-liver oil, and suggested that she should go into the country. I saw her again on June 19; the tumour had put on a definite aspect of being cancerous: it had become stony, and the skin over it was puckered, and it was more painful than formerly; she had then ptosis of the left eyelid. I proposed that, if the painfulness became excessive, or even increased, the tumour should be removed, although I considered the case one in which a very temporary relief only could be expected from operation. The patient, however, declined to have anything done. She died in October; and Dr. Saunders has given me the following further particulars. He writes:—"After you last saw Mrs. R—— she continued to take the cod-liver oil and tinctura ferri, and in a fortnight's time, or thereabouts, became so oppressed with fat that I was obliged to discontinue the oil; the fat lay in rolls over the abdomen and also over the ribs, and her breathing became oppressed, as if the heart was loaded with fat. The patient lost the use of her lower limbs about two months before her death, and she was confined to bed. She had very little pain in the breast, which became hard, rather larger, and fixed; there was no ulceration, but the nipple was very slightly excoriated. She had frequently pain down the left side of the neck, extending over the scapula. This pain was sometimes intense, and required for its alleviation the injection of morphia. The ptosis became complete and the left eye everted. The thirst was unquenchable; the temperature in the axilla towards the latter part of her illness reached 104°. The patient gradually sank." No post-mortem was made.

21. *Cancer of Breast—Amputation—Erysipelas—inadequate application of Sulphurous Acid.*

Mogford, æt. 57; admitted May, 1869. Cancer of breast, considerable redness, and inflammation of surface; treated with lotio plumbi up to June 2nd, when breast was removed by amputation; wound sponged with carbolic acid lotion 40 gr. to ℥i; and sulphurous acid lotion (1 in 6) applied externally. 9 p.m.—Patient has felt rather sick since the operation. Tongue moist, pulse 96; is thirsty. June 3, 10 a.m.—Pulse 110, temp. 103·2; passed a restless night; complains of considerable pain and great thirst. Tongue white and furred. Patient has vomited once since operation. Ordered the sulphurous acid lotion to be continued; ice to suck, spring bed, and effervescent saline. 6.30 p.m.—Pulse 90, tongue moist, thirst.

4th, 10·30 a.m.—Slept at intervals during the past night; pulse 116, temp. 100·1; discharge from the wound; ordered castor-oil enema, soda-water, disulphate of quinine, 2 grains every three hours, wine ℥vi.

5th, 10 a.m.—Bowels have not acted; slept better last night; still considerable pain in the breast, tongue cleaner; pulse 100, temp. 98·1. 6·30 p.m., pulse 90, temp. 100. 9.15 p.m., complains of pain in the right axilla.

6th.—Pulse 80, temp. 99; pain in axilla less, has passed fair night; tongue slightly furred, no sickness, appetite good, bowels have not acted since the operation. Ordered the castor-oil enema to be repeated. 7 p.m., pulse 80, temp. 99; bowels acted after enema. 10·15 p.m., pulse 80, temp. 99·4.

7th.—Pulse 80, temp. 100·4; tongue coated, erysipelatous, redness of skin near the wound, discharge not copious. 7 p.m., pulse 96, temp. 99·9.

8th, 10 a.m.—Passed a restless night, considerable pain in the wound; pulse 100, temp. 99·3; about three ounces of thick pus discharged. Redness of the surface, especially of the lower flap. The

sulphurous acid lotion has been constantly applied.* Bowels have not acted since the 6th, ordered a dose of castor-oil. 2 p.m., pulse 84, temp. 99·7; lotion of nitrate of silver, gr. ½ in ʒi., to be substituted for the sulphurous acid lotion, and to be injected into the wound. Ammon. bromide gr. x., aq. ʒi., twice a day.

9th.—Pulse 88, temp. 100·3; slept well, bowels have acted, tongue coated, moist, appetite good.

10th, 10 a.m.—Pulse 94, temp. 102·1; restless night from pain in the breast, a large quantity of discharge, some shivering last night, some headache. 6 p.m., pulse 97; tongue cleaner. 9·30 p.m., pulse 100; no return of the shivering.

11th, 10 a.m.—Pulse 100;† had a good night; complains of a feeling of numbness and coldness in the breast; tongue coated, but patient takes her food well. Ordered brandy ʒiv., sulphite of soda 20 gr.; aq. ʒss., every three hours. 9·30 p.m., pulse 100; patient complains chiefly of thirst.

12th.—Pulse 96; passed a good night, has less thirst; bowels have acted, tongue coated; discharge from wound copious, but the redness has diminished. Ordered the red surface to be painted with collodion. "Haust. quinæ" ʒss three times a-day.

15th.—Erysipelas spreading towards the shoulder; tongue cleaner, wound looks well.

16th.—Complains of headache, and of chills over the breast and shoulder.

17th.—Erysipelas has not extended; tongue much cleaner; from this date convalescence slowly followed and patient was discharged, July 27th. Unimportant alterations in medicine, and local applitions being made from time to time.

In this case the chills never amounted to a true rigor. The temperature was higher on June 3rd, the morning after the operation, and on June 10th, than at any other observed dates. Stay in Hospital thus about two months.

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* My conviction now is that it was not *renewed* sufficiently often.

† By an accident the temperature was not noted after this date.

22. *Cancer of Breast—Operation—Complete Absence of Reparative Reaction—Death—Post-mortem.*

(*From notes by Mr. Davis, who acted as interpreter.*)

Anne Evans, æt. 52, married, from Aberystwith. Welsh—could not speak English. Admitted December 13th, 1876. Regent Ward.

State on admission.—Tumour of right breast, six months' duration. In outer part of right mamma is a movable, firm nodule, about the size of a shilling in circumference: from it anteriorly towards the nipple the gland tissue is condensed and uneven; the rest of the breast is soft; nipple prominent; no adhesion of skin; a very small round gland felt in axilla.

Previous history.—Has had five children, youngest 15; no miscarriages (married twenty-three years). After her second child, abscesses formed in *left* breast, since which time she has used the right only for suckling. *Pain* in right breast twelve months before admission. Six months ago noticed a small tumour, about the size of a pea, in outer part of breast, above the nipple. General health always remarkably good.

Family history.—A brother had a tumour on right arm above wrist which first appeared when he was about forty-five or fifty years old; it slowly grew for some years, and, at last, his arm was amputated above the elbow. This was about seven years ago, since which time he has remained in good health, and is still living. Otherwise the family history is good.

On the 18th January, ether was administered and the breast was amputated, and the small axillary gland was removed. The bleeding vessels were twisted.

18th.—Temperature, evening, 99°.

19th.—Morning, T. 102°; evening, T. 103·2°. Pulse, 132.

20th.—Wound discharging very freely; there is little inclination for reparative action between the flaps. ℞. Ammon. carb. gr. iv., decoct. cinchon. ℥iss., 3tis horis. Wound syringed with lotio argent. nit.

gr. ii., aq. ʒi., lotio acid sulphurous 1 in 6, applied externally. Temperature has during the day fluctuated from 99·4° to 102·8°.

22nd.—Morning, T. 101·3°; evening, T. 103·4°.

23rd.—Morning, T. 102·2°; evening, T. 102·8°.

26th.—Morning, T. 101·2°; at 2 p.m., T. 102·2. Quinæ sulph. ℈i., potass. iod. gr. ii., potass. bromid., ℈i. ex aq. 3tis horis.

27th.—Pulse 144, soft; evening temperature, 103·6°. Quinæ sulph. gr. xv.

30th.—10 a.m., temperature, 103·8°; pulse, 144; respiration, 44. 2 p.m., temperature, 103°. Pulse very weak and intermittent, respiration shallow.

31st.—Respiration, 36; temperature, 102·6°. Respiration chiefly abdominal and jerking.

Death took place on February 2nd.

Report of *post-mortem* examination by Dr. Coupland. Weather mild and damp. Rigidity slight.

General appearance.—Body fairly well nourished. Right mammary region occupied by a large gaping wound, exposing pectoral muscle which is slightly covered by thin sero-purulent fluid. No union between margins of wound; no granulations. On dissection, the subcutaneous tissue in the neighbourhood, especially towards the sternum, was seen to be infiltrated with blood.

Thorax.—In left pleural sac there occurred about fifteen ounces of pale straw-coloured fluid; no lymph; no undue vascularity of pleura. On right side a few ounces of similar fluid was met with, but also without any lymph.

Lungs.—The right lung was for the most part pale and somewhat emphysematous: its lower lobe contained less air than the upper and was compressed to a slight extent. Scattered beneath the pulmonary pleura over the greater part of the posterior surface of the lung, from apex to base, were numerous petechiæ of a bright crimson colour; those at apex contrasting markedly with the pale fully inflated pulmonary lobules. The left lung was in a great measure collapsed; it was bound by a few old adhesions to the posterior thoracic wall. Its

lower lobe was quite airless, tough, and fleshy-looking. There was no evidence of pneumonic consolidation.

Pericardium.—A few capillary ecchymoses at base of heart.

Heart.—Left ventricle contracted, right full of blood. Tissue and valves healthy.

Abdomen.—The liver was of large size, vascular and fatty.

Spleen soft, but not enlarged.

Kidneys full of blood, slightly granular on surface, but no noticeable wasting of cortices.

Heart, 12½ oz.; right lung, 21 oz.; left lung, 24 oz.; spleen, 8 oz.; liver, 68 oz.; kidneys, 6 oz. each.

23. *Disseminated Cancer—Hæmorrhage—Watery state of blood preventing coagulation.*

Madame M——, aged between 40 and 50, native of Germany, was seen by me first on December 22, 1876. She had excavated and adherent cancer of the right breast, which had already existed two and a-half years; the glands in the axilla were enlarged. She had been under the care of Professor W——, of Vienna. She was the eldest of a family of six, all of whom were living. She was again seen by me on October 20th, 1877, having in the meantime developed numerous semi-spherical tumours of secondary cancer in various parts of the body, especially over the abdomen and trunk; the patient was very stout. She was now under the immediate care of Dr. Skrimshire, Talbot Road, Westbourne Park, who wrote to me on October 25th, remarking upon the wide dissemination of the cancerous disease, and upon the deep jaundiced hue of the skin, and stating that she was passing bile with the urine in considerable quantities, very little by stool. He described her digestion as much impaired, and appetite "nil." I saw Madame M—— towards the end of November, in consequence of unrestrainable hæmorrhage from the breast. The blood was very watery and refused to coagulate on the application of styptics. Dr. Skrimshire informed me that the patient died a few days

afterwards from the exhaustion consequent on the hæmorrhage from capillaries on the surface of the sore in the mammary region. He also informed me that one of the secondary nodules had given way about ten days previous to death; it discharged for a few days, and then ceased to do so. The secondary tumours were not only over the abdomen and pectoral region, as just stated, but over the back, thus causing great suffering from the pressure of the patient's body as she lay. Except in melanotic cancer it has very seldom occurred to me to meet with cases of this dissemination of cancer in nodules. I have given one other case somewhat of this kind; *vide* the case of Fisher, page 103.

Dr. Dickinson, "Trans. Path. Soc.," vol. xiv., page 240, reports a case of subcutaneous cancer, secondary to cancer of glans penis, the secondary tumours being widely disseminated. He says the body was covered with hemispherical prominences occupying the subcutaneous areolar tissues, some were found in the situation of the absorbent glands; others were found where these organs did not exist. On section they had all the character of encephaloid, and under the microscope the cells were of the rounded variety found in tumours of that nature. On the anterior surface of the heart was a nodule of malignant disease. There was a nodule of smaller appearance in the liver, and another in the spleen. The glands of the mesentery, and great omentum were all infiltrated with the same deposit. There were nodules on the outside of the bladder, and in the capsule of the kidney. The lungs were natural, but the right pleura contained a considerable quantity of fluid. The brain presented no appearance of the disease. The lumbar glands were enlarged. The patient, who died a fortnight after his admission into St. George's Hospital, was 70 years old, and had discovered the first of the nodules three months before his admission.

24. *Extensive ulceration from Cancer of the Breast without implication of Axillary Glands—Absence of Pleuritic Effusion—Costal Pleura thickened at part corresponding to the external sore.*

A *Post-mortem* examination of (by Dr. Lyell) HARRIETT JENKINS, æt. 59, April 13, 1876. No. 99. No. 221, Surgical Register:—

A superficially extensive ulceration destroying the textures over the greater part of the left side of the chest-wall, extending round laterally to the fold of the latissimus dorsi, anteriorly reaching upwards to the first intercostal space, and downwards to the sixth intercostal space. The depth of the ulceration varied from within outwards; centrally it had exposed the fibres of the pectoralis and serratus, on which were one or two isolated masses of cancer; circumferential to this, for a width of about two inches, the subcutaneous fatty layer only is exposed, around which a margin was formed of a narrow belt of slightly ulcerated skin. No enlarged glands in the axilla or elsewhere. Thorax: no fluid in either pleural cavity; on the left side a patch of the costal pleura corresponding to the external ulceration was thickened, opaque, and of a milky-white colour; elsewhere the pleura was transparent and glistening. Both lungs emphysematous; crepitant throughout, but congested at their bases, and exuding from all parts a considerable quantity of frothy serum; bronchi throughout injected and of a dark purple-red colour, and clogged with a tenacious mucus. Heart: right cavities distended with blood, containing purplish-black loose coagula; tricuspid valve dilated, admitting the entrance of the tips of four fingers; left ventricle contained a few partially decolorized clots entangled in the musculi papillares and valves; ascending aorta thickly studded with atheromatous plates, extending on to the cusp of the mitral valve. Abdomen: liver congested, mottled, and fatty. Left kidney studded with cysts of very various sizes; capsule adherent; cortex narrowed. Right kidney: capsule partly adherent, but to a less extent than the left. Spleen healthy. Uterus contained a small pealike fibroid; ovaries healthy.

Weights: heart, 13 oz.; right lung, 19 oz.; left lung 14 oz.; liver, 53 oz.; spleen, 3¾ oz.; left kidney, 7¾ oz.; right kidney, 5 oz.

25. *Disease commencing apparently in the Axillary Glands, followed by its invasion of the Breast.*

Susan Williams, æt. 60; admitted December 23, 1869. Seven months previously she noticed a small hard lump, about the size of a hazel-nut, in the left axilla. A month later the breast became somewhat hard. Three months since the arm began to swell. On admission, the whole of the left breast and the left axilla was occupied by a hard mass. There were numerous tubercles over the surface, some commencing to ulcerate. The skin was everywhere adherent, the hand and arm swollen and œdematous. There was severe pain in the breast and arm of a piercing and shooting character. There were gouty deposits in the right hand and wrist. She died February 13, 1870. The disease was thus of less than a year's duration.

In this case I gave iodoform 1 gr., three times a day, without affording any relief.

26. *Acute Cancer—Death within twelve months—History of Injury.*

Martha Barnes, æt. 54, from Malmesbury, Wilts. Admitted December 8, 1870. Twelve months since struck her left nipple with the handle of a broom. She suffered some pain for a little while, but noticed no swelling. Last June (six months after the blow) she found a tumour. On the 10th of August she observed, after doing laundry-work, that her left arm was swollen; the lump had then attained the size only of a walnut. There were some swellings in the neck along the anterior border of the trapezius.

State on admission.—In the left mamma is a tumour the size of a goose's egg. There is retraction of the nipple. Above the nipple dimpled portions of skin, and general œdema of cellular tissue over the breast; glands along the pectoral muscle and in the axilla enlarged.

Much induration beneath the pectoral muscle, and of posterior triangle of neck. Breast not freely movable on muscle; arm very much enlarged down to the wrist. Much pain in arm and breast. Cannot raise the arm to a right angle with the trunk. Florid complexion; no emaciation; sleeps badly; appetite not good. The patient remained in the hospital for a few weeks only, leaving it of course unrelieved, January 10, 1871.

Through the kindness of my friend, Mr. Charles Wightwick Pitt, of Malmesbury, I have learnt that the patient survived until the following April.

Mr. Pitt writes: "Martha Barnes died April 6th, 1871, æt. 53." I see in the Mortuary Register secondary cancer of the pleura registered, not, however, verified by *post-mortem* examination.

27. *Cancer of both Breasts—General Induration of Left Breast—scattered Pisiform Tubercles—Right Breast ulcerated—Œdema of right arm—numbness of right hand.*

Jessie Brend. No. 975. October 22, 1863. Last Christmas (1862) breast began to itch; brown spots then appeared; afterwards redness, succeeded by pain. There was gradual induration. The left breast was unaffected at that time. About March last (1863) was admitted out-patient. Two months afterwards the right breast "broke," and a great deal of discharge ensued. About three weeks later the left breast was noticed to be hard: pain quickly followed . . . . Soon after the date of her admission as out-patient (March, 1863) the right arm began to swell, and the numbness commenced. Three weeks previous to her admission as in-patient as above (October 22, 1863) there was numbness from hip to knee of the right side. The patient died January 6, 1864, the disease having carried her off in a little over one year.

28. *Cancer of both Breasts—History of Operation followed by Gangrene —Temporary abatement of grave symptoms.*

Martha Bonner, æt. 36; admitted February 6th, 1863. The left breast has a cicatrix extending to the axilla, surrounded by a hard ridge; the axillary glands are enlarged.

The right breast is shrunken, the skin over it is puckered, and the axillary glands are enlarged. There is acute darting pain in the nipple. The patient also complains of pain in the epigastrium; she vomits after all other food than dry crusts of bread; an indurated, sharp edge can be felt towards the spleen, and there is extreme tenderness in the right iliac fossa; pulse 100; general debility and anæmia. There is no family history of cancer, and until December, 1860, had ordinary good health; when, being pregnant three months, she had a flooding which was repeated in the following March, and finally she was delivered of a dead child in April. In September, 1861, she suffered pain in the left breast, and she noticed that it was drawn upwards towards the axilla, the pain later on becoming more acute and of a shooting character; December 30th she was admitted into University College Hospital, and on January 8, 1862, the breast was removed by Mr. Erichsen, she was then again pregnant five months. The wound was seized with hospital gangrene. In June the patient observed a swelling in the right pectoral region.

Feb. 21st.—About a fortnight after her admission into the Middlesex Hospital, the patient complained of partial loss of sensation in the left arm. March 2nd.—"She cannot take a deep inspiration without great pain." March 6th.—"No pain, appetite bad, and there is difficulty in breathing. (Carbonate of ammonia and hydrocyanic acid prescribed.)"

March 19th.—"Cough, breathing laboured, no sleep, extremities and lower part of abdomen œdematous. March 23rd.—"Œdema increased, appetite improved, cough less (morphia and senega prescribed)." March 26th.—"Abdomen less œdematous; the breasts are free from pain, and seem to be getting less" (quoted verbatim from the notes of the case).

From this date the patient steadily improved, and on May 19th she left the hospital at her own request, able to walk comfortably. However, she was re-admitted June 20th.—Breath short, pulse weak, pale and emaciated, great œdema of the lower extremities, and she died three days afterwards, June 24th.

At the *post-mortem* examination there was found pleuritic effusion. Emphysema (partial) of the right lung. Both lungs soaked with serum, and only slightly crepitant when cut. Fluid in the pericardium; heart 12¼ ounces in weight, aortic atheroma, liver enlarged, studded with firm white nodules; spleen elongated, much enlarged, very firm, numerous cancerous patches scattered over its surface.

Kidneys pale; capsule adherent; somewhat mottled with a few cysts.

Uterus normal; both ovaries enlarged with cystic degeneration and carcinomatous deposit.

29. *Cancer of both Breasts.*

Caroline Travis, æt. 53, late out-patient; admitted January 20, 1871. "Consolidated cancer of left breast; small nodule in the right breast, with small, hard glands in axilla. Disease commenced three years since; there are tubercles in the skin, and patient suffers pain down the arm. Three months later, April 28, nodules appeared around the nipple of right breast. Menstruation com. æt. 17, ceased at 50."

April 18.—"Ulceration has commenced and is spreading; disinfectants fail."

21st.—"Sloughing, no deodorant effectual. Chloralum, lotion sulphurous acid, ungt. bals. Peruv.; lotio acid. nit., solut. plumb. acet., with spray douche; lot. arg. nit. gr. ½ in ʒi.; lot. zinci chloridi having been tried. Death took place June 18, 1871."

Dr. Sydney Coupland, "Path. Trans.," vol. xxvii., p. 264, reports upon a case of cancer of both breasts and ovaries which had been under the care of Mr. Hulke in the Middlesex Hospital. The patient was 24 years of age, and the disease first declared itself in the right

breast, which was removed along with an axillary gland on the 22nd April, 1875. She was discharged on the 11th June convalescent. Towards the end of September she was re-admitted with recurrent knots, which were removed by Mr. Clark. In November, a second recurrence took place, beginning at the same spot, the right mammary region, and then the left breast became extensively infiltrated, and there was a rapid dissemination of scirrhus knots, through all the soft tissues, over the front and sides of the chests. She died in less than a fortnight, cyanosed and suffocated. On the *post-mortem* there was found no implication of the ribs or parietal pleura. The left pleural cavity contained a large quantity of dark straw-coloured fluid, and several shreds of lymph passed between the pleural layers. The right pleural cavity is not stated to have contained fluid.

Dr. Coupland appends an analysis of 89 cases of mammary cancer examined after death, showing relative frequency of the seats of secondary growth, and he gives 31 cases in which the right breast was affected, 41 in which the left breast, and 17 (19·1 per cent.) in which both breasts were affected.

The following are short notes, for the most part of Out-patients :—

30. *Cancer of the Breast without Secondary Deposit.*—Mary Callaghan, admitted as an out-patient April, 1859. Cancer of the right breast of ten years' standing, mother of one child. She died in hospital April, 1863. There was no secondary deposit in the viscera, but gangrene of the posterior lobes of the lung. The ulcerated surface of the breast exposed the third, fourth, fifth, and sixth ribs. Father died aged 60, and mother died aged 60.

31. *Cancer of Breast—Family History of Cancer and Tumour.*—— Sheldrake, aged 50, had been under the care of Dr. Barford, of Munster Street. Induration of the whole breast. Admitted April, 1860, died August the same year. She had two sisters who died of cancer of the breast, and had one sister living, aged 60, with a tumour of the belly.

32. *Cancer of Breast—Goitre—Family History of Cancer and Ovarian Disease.*—Hannah Phipps, aged 48, admitted June, 1861. Has cancer of the right breast, and a small hard goitre. The cancer has existed two and a-half years, but no alteration has taken place in the goitre since the development of the cancer. Her father living, aged 74, at that date; mother died with dropsy, aged 60. Maternal aunt had cancer of the breast. A paternal grand-aunt had cancer of the breast. A first cousin died of cancer of the womb. One sister died of ovarian dropsy; she was born at Stow, in Gloucestershire.

33. *Cancer of Breast—Family History of Phthisis and Apoplexy.*—Eliza Hendy, aged 59, admitted June, 1861; cancer of the breast. Mother died of apoplexy, aged 69. Two sisters died of consumption. Two brothers died of consumption.

34. *Primary Cancer of the Axillary Glands.*—Mary Webb, aged 53, admitted August, 1861. A large indurated purple mass reaching from the pectoralis to the latissimus dorsi. There is no nodule to be discovered in the breast, but there is generally fulness compared with the other side. She died in the hospital, November, 1861. *Post-mortem.*—Cancer of liver and abdominal lymphatics; right lung firmly adherent; pneumonia.

35. *Cancer of the Breast, Tumour having been removed from Breast thirty years previously.*—Jemima Hindley, aged 62, admitted September, 1861. Had a tumour removed from the breast by Mr. Baines, of Ludlow, thirty years previously. On admission had a lump round the base of nipple, and not very prominent, warty growths from the nipple itself. The enlargement is about the size of half an orange; it is not painful or tender. There is a bullet-like gland in the axilla; the skin over the back of the shoulders was covered with numerous brown sessile warts, such as are seen in chimney-sweep's cancer. The following year the tumour generally underwent a shrinking, but it was becoming more tuberculated.

November, 1865. The patient staggered and suddenly died in the

street. A *post-mortem* was made for me by Mr. Reeves, who found secondary deposits in the chest.

36. *Cancer of Breast—Operation—Sixteen years' interval before recurrence.*—Sarah Cameron, aged 37, admitted as an out-patient, June, 1862. Scirrhus of the right breast with a chain of enlarged axillary glands. Mother died of cancer of the throat (so reported). Father living, between 60 and 70 years of age. The tumour commenced two years ago; when first discovered no larger than a pea. In September the axillary glands were somewhat diminished; "but the tumour is very nodulated and is not diminished." I amputated the breast in the hospital. She was seen by me four years later, June 7th, 1866. She applied at the hospital, complaining of pains in the hands and muscles, these pains passed off. "Axillary glands not further enlarged." "Well" in October, 1868; and ten years afterwards, in 1878, examined by me in the presence of the Clinical class at the hospital, a slight return of the disease having made its appearance at the upper edge of the scar.

37. *Cancer of the right Breast at an advanced Age—Family History of Longevity.*—Mary Baker, aged 85, admitted February, 1862. Cancer affecting the centre of the breast, inactive, and had existed for two or three years. The patient's father and mother both lived to the age of 80.

38. *Cancer of Breast—Family History of Longevity.*—Ann Bürck, aged 61, admitted May, 1862. Central cancer of the left breast. Always been healthy, one of twelve children. Father died aged 88, mother aged 84.

39. *Infiltrating Cancer of the Breast—Family History of Phthisis.*—Fanny Buckland, aged 49, admitted October, 1862. General infiltration of the breast with shining tuberculations; painful, rapid increase during the past six months. When first discovered the lump was only of the size of a nut. The father died of consumption at 47, and the mother died of consumption at 33.

40. *Chronic Cancer, nearly ten years' duration.*—Janet Betts, aged 43, admitted October, 1861. Tall, florid-looking woman. Cancer of the right breast, which had already existed four years. There was retrac-

tion of the nipple, solidification of the lower part of the gland. No axillary or supra-clavicular enlargement. "Suffers great pain, especially at change of the weather. The tumour is fairly movable; the arm does not swell; has had thirteen children. She sleeps badly, in consequence of pain." No family history of cancer. I advised operation; the patient would not submit. The patient continued to attend until June, 1864.

Reported by her Daughter.—The breast ulcerated and sloughed. She was confined to bed nearly two years, and during the last year of her life was paralysed. She lived at Beaconsfield, near Windsor. Died in July, 1866.

41. *Chronic Cancer of left Breast—Removal by Fell's Process—Extension of disease to opposite side.*—Mary Kearney, aged 50, admitted out-patient October, 1862. Five years previously had the *left* breast removed by Dr. Fell's chloride of zinc process, and she remained well until Christmas, 1860. "During the past twelve months the right breast has become indurated, and there is retraction of the nipple. She suffers much pain, especially at the change of the weather. In the site originally operated on ulceration has taken place."

She continued to attend as out-patient, and in February, 1863, the following note was made:—"The sore at the seat of the original operation has spread. On the other side—the right side—atrophic changes are taking place. She suffers considerable burning pain in the left side. The pain on the right side is described as aching and sometimes stabbing." She died in September of that year.

42. *Cancer following Tumour of Breast at the age of 23 years, removed after eight years' duration.*—Ann Stewart, aged 36, admitted out-patient January, 1862. Cancer of the breast. At the age of 23 had a tumour of the breast, which, after eight years, was operated on by Mr. Ritchie, of Team, Staffordshire—that is to say, five and a-half years before her applying at the hospital. She had five children; two of them were born after the operation by Mr. Ritchie. She states that the breast was not more painful while pregnant. On admission,

there was an indurated mass towards the axilla above the cicatrix; and some induration in the cicatrix itself. She was admitted in-patient, and was operated on by Mr. De Morgan, February, 1862.

43. *Chronic Cancer, with family history of Nervous Disease.*—Ann Ireland, aged 66, admitted April, 1862. Twenty years ago first noticed a lump in the right breast, the size of a pea, which enlarged very gradually until within the last few weeks, when it rapidly increased. No enlargement of the axillary or cervical glands. Has suffered from rheumatism, but never had rheumatic fever. When 50 years of age had epileptic fits, which troubled her during two years.

In June the axillary glands became enlarged; in January, 1863, the breast was distinctly shrinking (the condition is shown in Plate II.). In July, 1864, the patient informed me that she had a sister dying of paralysis, and in September, 1864, she informed me that one of her daughters had died suddenly from apoplexy.

44. *Disseminated Cancer—Numerous Cancerous Deposits in the different parts of the body becoming suddenly quiescent after great mental emotion.*—Fanny Fisher, æt. 36, admitted April, 1862, out-patient. Two and a-half years since she observed a small lump, the size of a nutmeg, in the right breast; now there are besides several nodules scattered over the body. She applied two years ago at Guy's Hospital, where she was advised against operation. She then went to a quack in Pimlico who applied gas externally, and gave her white powders (these I proved to be of calomel). Christmas preceding the right breast ulcerated. The scattered tumours had been coming during the last twelve months. The right hand and arm swollen. By July the disease had made little progress. 25th September, "condition about the same." 16th October, "swelling of the hand and arm has subsided. She has not menstruated since May last. There are two nodules over the dorsum of the scapula; in all, fourteen

nodules over the trunk." 8th January, 1863—"A general shrinking of all the tumours to a most remarkable degree. This coincides with a shock to the nervous system caused by the sudden death of her husband." 5th March, 1863.—"The tumours are beginning to again increase." 2nd April, 1863.—"She has been generally not so well since the last visit." Admitted into the hospital with dyspnœa. She died April 11th, 1863. *Post-mortem.*—Adhesions at the upper part of the right pleural cavity; cancer deposit in the upper lobes of the right lung and carnification of the lower lobes; serum and lymph in the rest of the cavity of the pleura; the left pleura free from adhesions; the left lung contains cancerous tumours; no disease of the liver beyond it containing one small gritty mass the size of a pea.

45. *Chronic Cancer, Effusion into the Pleura an instance of probably Lymphatic Obstruction.*—Elizabeth Howes, æt. 55, admitted June, 1862. Tumour in the right breast discovered twelve months previously. No enlargement of the axillary glands. She died in the hospital June, 1865, with rapid effusion into the chest.

Post-mortem showed nodules of secondary deposit in the pleura, but by no means numerous.

46. *Cancer of Breast — Family History of Longevity.* — Diana Chapman, æt. 72, admitted November, 1862, with cancer of the right breast, which had existed two years. The patient is an exceedingly nervous woman. Mother died æt. 84. Father was killed. Maternal grandfather and grandmother lived to be 90 years old. No history obtainable of the paternal grandfather and grandmother. Two brothers died æt. 70 and upwards. One brother living between 60 and 70. Three sisters alive and healthy. Two sisters died as children.

47. *Cancer of the Breast, Patient's Sister having Fatty Tumour.*—Harriet Mandy, æt. 78, admitted December, 1862. Two semi-spherical nodules of cancer at the outside of the right breast, which had been discovered fifteen months since. Never painful at any time. No enlargement of the axillary glands. The arm does not swell.

This patient has a sister æt. 66, who has a fatty tumour of two years' standing at the edge of the axilla on the right side.

48. *Cancer of the Lymphatics of the Axilla.*—Mary Rainbach, æt. 73, sent to the hospital by Dr. Ayling, of Great Portland Street, admitted April, 1863, with cancer of axillary glands and œdema of the right arm. "There is a group of melanotic warts towards the lower border of the right breast; circular, hard warts on either side of the forehead." The patient died paralysed, September 5th, 1865, and I am informed by Dr. Ayling, under whose care she was, that the disease had not made much progress. She had hemiplegia of the right side.

49. *Cancer of the Right Breast, commencing eleven years previous to date of admission as out-patient, December*, 1863.—Susan Kite, æt. 47, living near Uxbridge. "Has a tumour of the right breast. Eleven years previously she had noticed a small movable knob the size of a pea; it was painless. Now there is an obscure induration at the axillary border of the gland. Within the last twelve months has been occasionally very painful. No history of cancer in the family."

January 7th, 1864.—"The axillary glands have become enlarged." The patient was living in December, 1866. She was seen by me on December 13th, the tumour having shrunk. She took citrate of iron for twelve months.

50. *Cancer of the Left Breast, involving Areola—Family History of Cancer.*— — Pellon, æt. 60, admitted April, 1864. The patient states that she had a lump in the pectoral region from her birth; but that twenty years since—that is, at the age of 40—it began to swell and became fixed. Her mother, she said, had a cancer exactly like her own, dying at the age of 70. Maternal grandmother died, æt. 78, with cancer. The patient was seen February, 1870, still living.

51. *Cancer of the Right Breast—Rapid recurrence after operations—Extensive Secondary Deposits—Invasion of the Vena Cava.*—Ann Wright, æt. 46. Admitted out-patient, March, 1863. Married. Seven children. She has a cicatrix in the right mammary region, like the capital letter Y inverted. At the upper extremity is a cancerous tuber. This cicatrix is the result of two operations for the removal of the breast, performed in University College Hospital. She first detected the disease in December, 1861. Nine months afterwards, that is to say, in September, 1862, it was operated on, the disease reappearing before the wound was healed. It was operated on a second time, three months later, on the 17th December, 1862, three months and a-half before her coming under my care. She was ultimately admitted as an in-patient, and died November, 1863. *Post-mortem.*—"A large sore is seen to extend from the collar bone to the sixth rib. The axilla is full of deposit of white napiform cancer, extending through the ribs and sternum to the anterior mediastinum, thence into the vena cava superior, the lung containing secondary deposits. The liver is free." Although the axillary vessels were surrounded by the deposits; the arm was swollen only as low as the elbow.

52. *Swelling of Arm, which subsided (partially).*—Eliz. Arnold, æt. 60. Admitted June 3, 1871; died June 30, 1873. At upper and outer side of left mamma is a foul ulcerated surface the size of half-a-crown, the edges of which are hard, red, elevated, and nodulated. There are several hard nodules scattered over the surface of the breast, and the axillary glands are enlarged. There is little pain; there is œdema of the left arm. Note of October 25, 1872. "Patient thinks the swelling of arm has diminished."

53. *Both Breasts affected—Atrophic Cancer of the Right Breast commencing on Weaning—Nodules of Cancer in the Left Breast—Cancer of the Uterus.*—Mary Holloway, æt. 42. Married. Five children. Admitted out-patient, June, 1862. Atrophic cancer of the right breast; axillary glands enlarged. The general health

was bad. She had been under Dr. Chorley, at Marylebone Dispensary, with hæmoptysis. The cancer had existed twelve months, and it commenced on the weaning of her last child, which she had suckled eight months. Her father died, aged 55, of consumption. Her mother died, aged 40, of "inflammation of the bowels." She remained out-patient during ten months, by which time numerous nodules of cancer had made their appearance in the opposite breast. She died in the hospital, July 24th, 1863. The right lung was found adherent at a part corresponding to the breast which had ulcerated. The left lung was free from adhesion. There were cancerous nodules in the liver, and *the os uteri was cancerous.*

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54. *Cystic Encephaloid of Left Breast, followed by Scirrhus of right six years after.*—"Trans. Path. Soc.," vol. xix., p. 394.

Case by Mr. De Morgan: The patient, SARAH P——, æt. 55, admitted in the first instance January 4, 1862, into the Middlesex Hospital. Five years before her admission—that is, about the age of 50 years—she first noticed a small swelling in the left breast. A year afterwards the tumour, which was obscure at first, became pronounced. "About five weeks before admission the skin gave way at the outer part, and there is a circular sprouting vascular growth projecting through the skin, which can be separated from it all round. The diameter of this growth is about three inches. Elsewhere the skin is smooth and freely movable. The tumour itself is nodulated and slightly elastic. It measures eleven inches over its surface in its longitudinal, and ten inches in its transverse, diameter. The borders can be clearly defined. It is very movable. The nipple is unretracted. The glands in the axilla are not to be felt. In *the right side* (*i.e.* the right breast) is a hard tumour which commenced a year and a-half ago, and now occupies the whole breast. The nipple is retracted, the skin puckered and adherent, with an ulceration about two inches in diameter above the nipple. In the axilla is a cluster of large hard glands."

Mr. De Morgan states that, "Previous to her admission she had

had on two or three occasions severe hæmorrhage from the sprouting growth on the left breast, which had weakened her much." He adds, "As I believed the tumour was not cancerous, and as the tissues around were sound. . . I determined to remove it." The operation was done on the 8th of January. The wound healed rapidly. She went out in good condition, and lived more than two years and a-half after, dying at last from the cancerous disease in the opposite breast, no disease having recurred in the side operated on.

The disease in the left breast had, it would thus appear, existed three and a-half years before any disease was discovered on the right breast—that is, the patient was between 53 and 54 years of age when the scirrhus commenced. Mr. De Morgan gives his account of the microscopical examination of the tumour:—"The juice was found to contain cells and nuclei of various forms. . . . All those who saw them said that they should have no hesitation in pronouncing them to be cells from a malignant growth. A fine section presented also peculiar characters. The structure seemed to be in many parts made up of cells arranged in a linear manner, so as to give the appearance of fibroid growth, but with so little cohesion that at the margins they floated off."

Mr. De Morgan remarks, "The duration of four, if not five, years' of continuous growth is not what we should expect in encephaloid disease."

The preparation, or specimen, was submitted to the Committee on Morbid Growths, May, 1868, after it had been six years in spirit. The Committee reported as follows:—"A thin slice of the tumour exhibits a number of openings, which are no doubt sections of tubes and a quantity of more or less fibrillated tissue intervening between them. The amount of this tissue and the degree of fibrillation which it possesses vary very much in different portions of the tumour. In many places it appears as a finely granular matrix, with but little tendency to the formation of fibres, and in some parts wavy fibres are abundant. In all places, however, cell and nuclear structures are plentiful. These cells are small, round, or oval bodies, with a few spindle cells, and are uniformly

of the connective-tissue corpuscle type. In those portions of the tumour where the fibrillation is most distinct there is a tendency to a concentric arrangement round the tubes. The tubes themselves exhibit the structure of enlarged gland-tubes, and in places there is an accumulation of epithelium within them.—(See Plate XII., fig. 6, of vol. xix. of the "Trans. of the Path. Soc.")

"From an anatomical point of view, therefore, the tumour is a sarcoma—one of the small-cell kind, but characterised by being a growth infiltrated throughout the substance of the breast."

The drawing, which was made under the unfavourable circumstances of the preparation having been so long in spirit, suggests the condition shown in Plate XIX., fig. 3, of this work, which is a drawing of a section of scirrhus mamma removed by Mr. Lawson.

55. *Myxoma of the Breast—Amputation—Recurrence—Second removal, Cicatrix remaining sound—Recurrence of Disease within Thorax.*

A. Place, æt. 38, admitted, October 11, 1871. "Widow; mother of one child; has always been delicate. Has a tumour of the right breast four inches in diameter. She is free of other disease. Her father, one brother, and two sisters died of phthisis. In May preceding she first noticed two small nodules, which shortly became fused into one, and then the tumour grew rapidly to its present size. The tumour appeared to be independent of the tissue of the gland itself." The patient complained of much pain in the breast, which extended to the back. I amputated the breast on the 25th (operation having been delayed by the catamenia), and the patient was discharged December 18 following convalescent. Re-admitted, with recurrence, January 13; second removal, January 25.

Mr. Morris exhibited the specimen removed at the Pathological Society, May 21, 1872, and he gave these details. (*Vide* "Path. Soc. Trans.," vol. xxiii., p. 274.) He also minutely described the structure microscopically. State on admission.—"At the lower part of the sternal side of the right breast is a hard tumour measuring 4 inches in its transverse and 4½ inches in its longitudinal diameter;

its outline is somewhat rectangular, and it projects beyond the breast downwards and towards the middle line. The skin over the inner part is adherent, but over the outer part there is apparently healthy gland tissue; where the skin is adherent the surface is slightly reddened, and here at one spot there is a sense of fluctuation; the tumour is movable on the chest-wall. There is constant shooting pain in the tumour, and there is pain through the back on coughing. No enlarged glands in axilla."

"Breast removed October 25; recurrent growth on January 25, by galvano-cautery." "The intercostal muscles were exposed in the operation; chloride of zinc paste was afterwards applied. She is now (May 21, 1872) quite well and uses the right lung as perfectly as the left." "The original tumour presented to the naked eye on section, two or three spaces filled with a gelatinous or colloid-like fluid; it consisted for the most part of a soft, solid substance, chiefly of a greyish colour, mottled with plum-coloured streaks; a small quantity of fluid, similar to that in the cystlike spaces, moistened the whole of the solid portions. Around the greater part of the tumour was what looked like a thin whitish limiting membrane." "A very small cyst with clear gelatinous-looking fluid, which microscopically presented the appearance of milk, such as was elsewhere found in the ducts of the breast, was found beneath the mammary gland and at some distance from the tumour itself."

Report by the Committee on Morbid Growths:—"Sections from this displayed the usual characters of the firmer varieties of myxoma —namely, a mixture of coarse, fibrous tissue, with elongated spindle cells, and a certain proportion of larger, less regular cells, with long, delicate, branching and intercommunicating processes, forming a reticulum pervading the growth. In consequence of the hardening process" (for the purpose of section) "the viscid mucous fluid which had filled the meshes of this reticulum was no longer present."—Signed by W. Cayley, Henry Arnott.

A year afterwards (October 19, 1872) the patient was re-admitted suffering great pain in the right side of the chest. There was

nothing abnormal about the cicatrix, but there was dulness on percussion as high as the fourth rib. The pain in the side was sharp and excruciating; there was a hacking cough; heart sounds normal; slight friction sounds to be heard over the fifth and sixth rib and corresponding intercostal spaces. The patient died exhausted, in less than a month (on November 4).

The following is transcribed from the Post-Mortem Register:—"Body fairly nourished. A scar, which is perfectly fair, in the situation of the right breast. Body opened so as to avoid interfering with this, which is found to be not anywhere adherent to the ribs, and no disease affecting the bones. On obtaining a view of the thorax and abdomen, a large mass presents itself in the liver region, pushing that organ over to the left side and compressing the lung. On removal of the whole mass, it is found that there is a larger tumour beneath (behind ?) the liver, which appears to have commenced in the lung and to have gone through the diaphragm, scarcely any of the natural lung being left, the lower lobe being replaced by the tumour. A mass the size of a woman's head occupies the liver, and this mass, when cut into, is seen to be connected with that growing from the lung. The muscular tissue of the diaphragm is infiltrated. The liver itself is very large, and studded with white patches, which, microscopically examined, were found to be made up of cells like liver-cells somewhat altered in shape. The left lung is tolerably healthy, with here and there secondary deposits; both kidneys extremely granular; on the surface of the left is a small deposit about the size of a pea; spleen, dark-coloured; heart, natural; brain, small."

November 17, 1872.—I showed the tumour of the liver and lung, and the following is the report on the specimen by Dr. Caley and Mr. Arnott, "Trans. Path. Soc." vol. xxiv. p. 120:—"The tumour, which was nearly as large as a fœtal head at the full period, occupied the posterior part of the right lobe of the liver, and projected from its upper surface, where it was closely adherent to the under surface of the diaphragm, to the corresponding upper surface of which the lung was firmly united.

"The circumferential part of the tumour was semi-transparent, the deeper portions opaque and yellow, and of a denser consistency; the centre had a somewhat puckered aspect, and was sunk below the general surface of the section.

"Microscopical examination of the more transparent outer portions of the growth showed a reticulated tissue composed of cells, and their processes mingled with irregularly interlacing fibres. The majority of the cells were spindle-shaped, containing large oval nuclei, and gave off at their extremities long, usually branched tails. Others were of irregular forms, and gave off long delicately-branched processes from various parts of their circumference. In addition to these were many swollen bodies, with irregular branching processes, but without any visible nuclei. The interstices of the reticulated tissue thus formed were filled with a glairy viscid fluid. The tumour thus presents the characters of a myxoma."

Mr. Cooper Foster exhibited at the Pathological Society, March 19, 1872, a myxomatous tumour from the breast. The patient was 57 years of age; was married, but never pregnant. "A section of the parts removed show that the tumour was situated between the breast and subjacent muscles." A report by the Committee on Morbid Growths, p. 261, vol. xxiii., is lengthy. I quote only one line: "The mammary glandular tissue is evidently implicated."

A note added June 24, 1872: "Since reading the report before the Society the tumour has rapidly returned on the cicatrix. No further history of the case has been obtainable."

56. *Spindle-celled Sarcoma of the Breast, of large size—Amputation—Recurrence—Second operation.*

Extracted from "Trans. Pathol. Soc.," vols. xviii. and xix.

——, æt. 28, unmarried, mother of two children, admitted into the Middlesex Hospital, March 11, 1867. Two years previously, subsequent to lactation, she first noticed a lump the size of a broad bean, midway between the nipple and the clavicular border of the gland; this lump grew rapidly, and after six months proved painful, the pain

being of a lancinating character. Ten months before admission the skin ulcerated at about the centre of the tumour; the tumour then grew still more rapidly.

On admission the tumour measured twenty-three inches and a-half in circumference, and appeared to be made of large rounded lobes; the skin was discoloured, being more or less livid and marked by large and tortuous veins. Through the ulcerations pale yellowish fungous excrescences as large as walnuts protruded, yielding an offensive discharge. The tumour was very tender on being handled. No enlargement of lymphatic glands was perceptible. The tumour was removed March 11th, and the patient returned to her home in Wales with a sound cicatrix, May 7th.

The tumour weighed four pounds twelve ounces. On section the tumour is seen to be made up of lobes, each lobe being bounded by a fibrous envelope. In the central lobe the envelope forms one-half the thickness of the lobe. At various points cavities containing fluid exist. On microscopic examination the tissue is seen to be fibrous mixed with granular cells, especially as regards the central mass; more externally, round nucleated cells are collected into masses, and are tolerably uniform in shape and size. Mr. Arnott (the then Surgical Registrar of the hospital) examined the tumour microscopically, and he reported that it is chiefly made up of spindle-shaped and round or oval mono-nucleated cells, with fibrous tissue.

"Within three weeks of leaving the hospital the patient discovered a fresh outgrowth, and on her re-admission in July a mass the size of two fists was to be seen at the site of the first growth."

On the 31st July I repeated the operation of removal; it was evident, however, that the morbid structure had extended through the intercostal spaces, and that the operation could not be other than incomplete. Perchloride of iron was very freely applied to the raw surface. The patient afterwards suffered no constitutional disturbance or pain. The wound had not time to cicatrize before a renewed sprouting of the growth occurred. No astringent or escharotic had the least beneficial control over the growth, and the patient died from

exhaustion, October 23, 1867. The *post-mortem* gave only negative results as regards other diseased conditions of the internal organs.

I exhibited at the meeting of the Pathological Society, February 4, 1868, two specimens from this case; one, the smaller, the mass removed by the second operation of July 31; the other, including the sternum, with portions of the ribs, and the cartilages removed at the *post-mortem* examination, showing externally a large bulk of tumour, and internally, on its pleural aspect, some tuberose extensions of the tumour which had invaded the thoracic cavity. These tubers presented *no central depression*, like the tubers of cancer, but were semi-globular, and covered tensely by the pleural membrane and the stretched intercostal muscular and other fibres. The death was similar to that of a patient killed by cancer; thus far the disease resembled cancer, but the microscopic section showed that the cell-elements of the tumour betrayed no irregular development and intrinsic tendency to degeneration. The cells appeared to have a maturity definitely marked by a certain size, and to possess a persistent vitality, the inflammatory phenomena being dependent on extrinsic irritation, accidental, so to speak, and not, as in cancer, being the consequence of intrinsic atrophic change. The microscopic sections showed, besides, a nearly uniform mature cell-development, with a very delicate trabecular fibrillation.

The Report by the Committee on Morbid Growths:—"We received for examination the sternum and end of ribs, with certain soft parts attached. A large lobulated tumour lay on the anterior aspect of the chest-wall, occupying the position of the right mammary gland, and extending thence in several directions. The growth had penetrated several of the intercostal spaces, causing erosion of bone in its passage, and appeared within the thorax, forming rounded protuberances underneath the costal pleura.

"These parts, which had been removed after her death, were accompanied by a large mass which had been taken away during life. . . . . We have examined with the microscope many parts of both growths, having been materially assisted by some sections

forwarded by Mr. Nunn, which had been made while the structures were fresh.

"The tumour consists of a filamentous tissue, abounding with nuclei, and would be generally classed as a fibro-nucleated tumour. (See Plate XIV. figs. 1, 2, 3, 4, vol. xix. of the "Trans. Pathol. Soc.")

"The basis of the mass is a delicate, transparent, filamentous material, which exists in some places in considerable abundance, occupying broad spaces between the nuclei, while in other parts this structure is scarcely to be seen between the multiplied and crowded nuclei.

"The nuclei imbedded in the substance of this filamentous material vary in shape, as shown in the drawings, from round to oval, and even assume more or less stellate shapes, owing to their elongation in more than two directions. The nuclei vary in size, and often display nucleoli, and frequently exhibit a tendency to fatty degeneration.

"In some parts of the mass the nuclei are so closely packed that no intervening material is seen in other places; these are few and scattered. Where they are most abundant they are round, or nearly so; where more sparsely distributed they are spindle-shaped or irregular, as described. They frequently extend into fibres.

"The nuclei are mostly arranged in a concentric manner around what we believe to be blood-vessels, being round and closely placed next to the vessel, while towards the circumference of the system they are elongated and scattered. This method of growth, the accumulation of the formation around branching vessels, has given a lobulated form to the mass, the central line of each lobule being a blood-vessel. The lobules or cylinders, of which the growth essentially consists, vary in size from rounded masses obvious to the naked eye, to small cylinders only to be discerned by microscopic examination. One of the smaller cylinders is represented in the plate, fig. 3."

Cancer of the Male Breast.—Cancer of the male breast has, of course, some of the general appearances of cancer of the female breast. I have had to treat a small number of cases only, and these in old men. Of two, one was æt. 75, and the other æt. 80. The latter

patient was seen by Mr. George Pollock. The cancerous disease did not apparently affect the general health, the first patient complaining only that he, of late, was not quite so able as usual to take his habitual seven or eight mile walks. I have already given the details of this case. But there have been in the Middlesex Hospital cancers of the breast in much younger men. I have appended a case which was under the care of Mr. Lawson in the Middlesex Hospital. The patient was 41 years of age, and, as some blood-stained discharge occurred from the nipple, the glandular tissue was the earliest affected.

The tumour has, as I have said, some of the general appearances of cancer in the female breast; but, as far as my observation goes, there is more fixation, and infiltration of the skin is earlier. I have, however, met with cases of cancer in the female breast resembling in these respects cancer in the male. A drawing of a section of such a cancer is given, magnified by a low power, Plate XII., fig. 1. On the left of the drawing is seen the cutaneous limit of the section, and towards the middle and right lobules of fatty tissue, and the alveolar arrangement is as is shown at Plate XIX., fig. 2.

57. *Case of Cancer of the Male Breast.*—June 25. I. B——, æt. 41, carpenter. Under the care of Mr. Lawson, Broderip Ward, Middlesex Hospital. The first symptom noticed, between three and four years before admission, was a slight bleeding from the nipple, just sufficient to stain the shirt, and appearing once or twice a week. Three or four months after found a small substance, not larger than a pea, below the nipple, firm to the touch, more prominent at some times than at others, the nipple remaining healthy. As the tumour enlarged somewhat, the bleeding from the nipple ceased; the growth further increasing, the skin became involved and discoloured. Ultimately, it sloughed, and ulceration gradually extended, destroying the nipple. There was little pain. No history of cancer in family beyond the fact that a paternal aunt died of cancer of the breast.

The state on admission.—"On the front of the chest-wall on right side is a circumscribed raised infiltration, about two inches by one

inch, with long axis transversely. The centre corresponds to the situation of the nipple, and is deeply ulcerated (about three-quarters of an inch); elsewhere the ulceration is more superficial. Around the ulceration the skin is reddened and adherent; the ulcerated surface is partly covered by slough and partly occupied by larger red granulations. In the axilla is a large, movable gland, the size of a walnut." Mr. Lawson amputated the infiltrated area freely, removing surrounding sound skin, down to the pectoral fascia, and, by extension of the incision into axilla, removed the enlarged gland.

Patient transferred for a time to St. Mary's Hospital.—A recurrence of the disease took place which was again operated on by Mr. Lawson. Sections of the parts removed at this second operation are represented in Plate XIX., fig. 1. Invasion of the pectoral muscular tissue is shown.

58. *Recurrent Cancer in the Male Breast.**—At the Meeting of the Pathological Society of Dublin, Saturday, February 10, 1872, Dr. A. W. Foot exhibited two drawings of a stomach and of a liver taken from a man who died at the age of sixty. Twenty-one years before his death a tumour was removed from his left breast, by the late Mr. Smyly, in the Meath Hospital. He came back to the hospital, ten years after the operation, with a second tumour occupying the situation of the former one; this had appeared soon after the operation, and had grown but slowly till a few months before his second application, when he hurt it, and caused it to bleed profusely. After that time it rapidly increased in size. On his second admission it was of the size of an orange, firmly attached by a broad basis to the structures in front of the left mammary region; moved freely over the pectoral muscle, and was not adherent to the ribs. It projected from the body, and sprang from the cicatrix left by the former operation. It had a spongy and resisting feel, and gave no pain. The skin had ulcerated over the summit of the tumour, and

* *Brit. Med. Jour.*, April 6, 1872.

was there, in many places, incrusted with scabs. Along part of the cicatrix, stretching towards the axilla, were livid cartilaginous nodules. The tumour was removed, and, on section, it was white, homogeneous, cartilaginous in feel. The wound granulated rapidly, and there was no re-appearance of the tumour in the part. Eleven years afterwards, in September, 1871, the man applied, for the third time, at the Meath Hospital, and was admitted into the medical wards under Dr. Foot's care. He complained of difficulty of swallowing, and of a "lump in his side," both which symptoms he had first noticed, simultaneously, six weeks previously. There had been no further growth in the left mammary region. The liver was enlarged, not very hard, not tender, bossed, and gave well-marked peritoneal friction from the movements of the diaphragm. Neither ascites nor varix of the superficial veins of the abdomen was present. He had no pain, except a slight occasional "catch" in the right side; but complained of insomnia and dysphagia, with profound debility. The dysphagia increased until he became unable to swallow even fluids. He had been an abstainer from spirits for thirty-five years, and small quantities of whisky appeared to have great power in sustaining his life. He lived three weeks after admission. The cardiac orifice of the stomach was obstructed by a black fungous mass, so that a catheter, passed into the stomach with some difficulty, was felt moving over nodulated resisting masses. The carcinomatous mass extended principally along the lesser curvature, and was covered with ragged, irregular ulcerations, the whole exhaling a most fœtid odour. The œsophagus proper was not involved. The liver weighed eight pounds; it occupied the upper half of the abdomen from side to side, and was bossed and humped.

59. *Cancer beginning as a Scaly Patch.*—William Parker, aged 62; was admitted out-patient September, 1861, with cancer over the sternum in the form of a semi-globular ulcerated tumour. Ten years previously it commenced as a small scaly patch, which used, as he expressed it, to "shell off dry." After two or three years it gradually enlarged and became moist, and remained so six or seven

years. He was treated at St. George's Hospital, and the sore healed. After twelve months it broke out again, and he was treated by a specialist, with chloride of zinc paste; after six weeks it healed again. A recurrence took place in eighteen months, when the chloride of zinc treatment was repeated, cicatrization being again obtained. It remained healed for two years, but since the last cicatrization it began to grow into a lump. There was no family history of cancer. Father died aged 72; mother died aged 72.

60. The following illustrates the difficulties that beset diagnosis and prognosis, even with the aid of microscopic examination:— At the Pathological Society, November 6, 1866, I showed a tumour, from the shoulder of a man aged 67, which had within nine months attained the size of a large fist. It was elastic, and had the external appearance of medullary sarcoma. A microscopical examination was made by Mr. Hulke and Dr. Cayley, who reported on it, December 18, 1866. These gentlemen said that principal part of the mass had the structure of trabecular spindle-celled sarcoma, but that parts of the tumour showed "an anatomical affinity with cancer by their alveolar structure, and by the almost complete absence of intercellular tissue."*

In May, 1867, a small tumour had made its appearance in the middle of the cicatrix; the patient declined then to have it removed, and he passed for the time from my hands. He went to a special hospital —the Mesmeric Infirmary, I believe—where the tumour was irritated by injections of some kind without result. The tumour having increased and a second small mass having formed, he returned to the Middlesex Hospital. I then removed the tumour, but without employing any of the extreme precautionary measures that I adopted in the first removal, such having, apparently, failed. The wound healed in the ordinary manner, and up to 1878 there was no return of the disease. The patient was inspected in that year, by me, in the presence of several students, at the Middlesex Hospital.

* "Trans. Pathol. Soc." vol. xviii. p. 240.

I have thus endeavoured to portray, by illustrative cases, the varying and various phenomena of cancer of the breast, the duration of the disease fatal within the short period of 12 months, or prolonged over a period of nearly 20 years, and have given instances where the gravest symptoms subsided when death seemed imminent, and yet a remarkable alteration, apparently for the better, took place, the patient being able for a while to leave the hospital.

I would now refer to the appended tables of post-mortem examination of patients dying with cancer of the breast, which will show at a glance the general character of the fatal complications. It will be observed with what frequency the thorax and its contents are the seat of secondary mischief; how the pleural cavity becomes filled with exudation; how the lungs themselves have their functions impeded.

In the details of cases in several instances the weights of the lungs are given. Taking the normal average weight in the female of the right lung to be 17 oz., we find that it has in some instances reached 20 and 21 oz.; while the average weight of the left lung may be taken at 15 oz., its weight is seen to vary from 7 oz. to 24 oz. The implication of the lungs is better shown by placing side by side the relative weights of the right and left lung; thus, we have (Case 4) the right lung weighing 13 oz., the left lung 11 oz.; Case 7, the right lung 19 oz., and left lung 8 oz.; Case 9, the right lung 20½ oz., and left lung 9½ oz.; Case 10, the right lung 20 oz., and left lung 8½ oz.; Case 19, the right lung 20 oz., and left lung 13 oz.

Effusion into the pleural cavity is usually regarded as the product of inflammatory action of the pleura, and is spoken of as pleuritic. Although the evidences of pleurisy other than fluid, may be met with, I believe that fluid in the pleural cavity is often due to the specific affection of the lymphatic system which gives rise to the œdema of the upper extremity; however, whether the hydrothorax be inflammatory or passive, it is one of the common causes of death.

The liver holds a place, as a seat of secondary cancer, of importance not less than that of the lung, perhaps of more pathological signi-

ficance, being further removed from direct contamination from the primary disease of the breast.

The almost universal disorganisation of the axillary lymphatic glands will also be observed. Thus is indicated the close relation between cancerous change in a part and alteration of the lymphatics, mischief identical springing up in the lymphatic system in connection with the part affected. The lymphatic glands may escape for a time being involved, but sooner or later, as the tables show, they participate in the general change and yield to the disease. I have elsewhere suggested that the cancerous change is, in some cases, specially located in the lymphatic system.

The rarity of cancer in the brain stands in marked contrast with the frequent coincidence of fibroid tumours of the uterus: disease of the ovary other than cancerous is not common; while cancer of the ovaries, uterus, and vagina, is quite exceptional.

I feel it necessary to state that the post-mortem examinations on which the tables are based were made by many different gentlemen on whom in the course of several years the duty devolved, and I believe, although, from force of circumstances, every post-mortem examination may not have been exhaustive, yet the data given in the tables are substantially correct.

In the general treatment of cancer, and in the management of patients suffering from this disease, there are moral difficulties that have to be met. The surgeon knows beforehand that in the long run his endeavours will be defeated, and that he is fighting a battle in which victory is well-nigh impossible; he must be sustained in the contest by the reasonable hope that he may at least alleviate suffering and even prolong life. The, possibly well-meant, interference of the patient's friends occasionally complicates the situation.*

The use of any alcoholic stimulant must not be allowed to run

* As an instance of the mischief from meddlesome intrusion from a non-professional suggestion within my knowledge, a lady was induced to apply a strong brine of common salt to a large open sore, consequent upon ulceration of a chronic cancer of the breast. The result was a grievous aggravation of her suffering

on into its employment as a narcotic. I have observed when patients, previous to admission into a hospital, had the means of obtaining and took large quantities of brandy, that they appeared to suffer more than those who either did not drink it from choice or had not the opportunity of drinking to such excess. Regarding the administration of morphia and other narcotics, no rule can be laid down beyond that of caution against the gradual insidious increase in the dose. If this increase be permitted, the quantity ultimately required to produce the effect desired by the patient, especially if morphia be exhibited by the hypodermic syringe, will grow to be not only incredibly extravagant, but unmanageable. The relief, however, afforded by hypodermic injection, in some cases of general infiltration of the pectoral region with dyspnœa, is most striking, but even in such cases the same firmness in withholding more than is absolutely necessary must be maintained.

It will be found that where pain is caused by temporary congestion, abstraction of blood by leeches gives relief, and further advantage is gained by the application of cold by means most convenient, according to the intensity that may seem desirable or can be borne without discomfort. There need be no hesitation in using leeches; I have never found any complication arising therefrom.

It is advisable to limit the movements of the upper extremity on the side of the affected breast whether operation has been resorted to or not. Hard work is certainly injurious, and the lighter forms of labour often distinctly increase the pain. I may here observe, that in making any examination of the tumour it should be subjected to as little pressure from the fingers as possible. I have seen extravasation into the cancerous tissue produced, without doubt, by unnecessarily rough handling; and short of this, a painfulness and tenderness is sure to follow repeated and severe manipulation, as, for instance, where a patient may have thought proper to consult two or three surgeons on the same day. The kind of pain arising from mechanical violence may be best relieved by bathing the breast alternately with hot and cold water for

several times in succession, twice a day or more often. It is of primary importance, by every means, to prevent inflammatory action, and to endeavour to control it when it has been lighted up. It is to be more than suspected that inflammatory action not only softens the tissues, but so arouses the activity of the lymphatic system, that contamination and infiltration are hastened and diffused.

The patient should be cautioned against exposure to cold, and should be instructed how most effectually to protect the breast against its influence. To the same end, that is to say, the warding off local inflammation,—are there any internal remedies? I have persistently prescribed iron in various forms, but generally in small doses, so as to avoid inducing headache. The selected preparation of iron may be combined with chlorate of potash. I say I have persistently used iron internally: this is intended to imply my belief that good effects resulted therefrom. Patients under my observation have taken Chian turpentine without, as far as could be seen, the slightest effect on the disease. I have never prescribed it.

I again repeat there are conditions of the breast simulating scirrhus, due to interstitial mastitis, caused by constitutional syphilis, and analogous to syphilitic sarcocele; these have disappeared under remedies such as mercury, and have thus led to wrong inferences. I have met with one case in the male, due to tertiary syphilis.

I have experimented with the continuous galvanic current in a mild form, but sufficient to produce definite indication of the entrance and exit of the current: I could not detect that any influence was exerted on the actual disease. The small sores following the eschars, where the current passed, healed quite readily. The case experimented on was one of brawny infiltration.

Where, after the removal of one breast, the other becomes also cancerous, the propriety of a second operation is very questionable. I have never operated under such circumstances, and, from what I have learned of the result of such a second operation, I am led to conclude that no advantage is to be gained therefrom.

I have before alluded to precipitancy in operating. Where no

doubt can possibly be entertained as to the existence of scirrhus no purpose can be served by delay, but a correct diagnosis is not always a matter of certainty even in the most experienced hands.

A circumscribed induration of the breast, which will disappear, occasionally happens in women at the age most liable to cancer as well as at other ages. One such case, for example, I referred several years since to my late colleague, Mr. De Morgan, for his opinion. I followed Mr. De Morgan's advice to watch the case and administer a course of solution of potash. The patient is now living and in good health. The result justified the soundness of Mr. De Morgan's opinion. In this case Mr. De Morgan wrote to me as follows :—" I suppose the case is rather of the nature of fibrinous deposit. I should give liquor potassæ with iodide of potassium. I believe that persistence in this will send it away."

Tumours that disappear thus have not always so satisfactory a sequel. A lady was placed under my care by an eminent surgeon, who wrote to me saying that she had a lump in the right breast, but that it was important that I should know that she had had a similar lump on the left side (a lump considerable and very scirrhoid), which disappeared under treatment, and of which not a trace remained. He also drew my attention to the fact that the patient *was an irritable nervous woman and was complaining of various quasi-rheumatic pains.* He advised a recurrence to the treatment, viz., pressure by careful strapping, which had acted singularly well on the tumour in the first instance of the left breast. I was unable to carry out this indication as the patient left town for Brighton, where she died some months afterwards with symptoms of cancer of the spinal cord. I have little doubt that the quasi-rheumatic pains were really due to the commencement of spinal mischief, and that the case was an example of secondary affection of the cerebro-spinal system spoken of at page 27.

I have committed myself to the opinion that any partial removal of the mammary gland, even when only a small nodule of cancer is all that can be detected, is useless, to say the least, because I believe that the outbreak of cancer at any point of the gland,—whether the disease

begins in the centre of the organ, causing retraction of the nipple, or, whether in a peripheral lobule producing an isolated, or rather an apparently isolated and movable induration or "tumour,"—is a manifestation of a constitutional degeneration, and not simply a purely local disease, *i.e.* a disease strictly located at the part where it at that moment exists.

Would a surgeon, who held that cancer in its beginning is an absolutely local disorder, venture to remove only that part of the breast which contained the entire then existing mischief; or would he justify total removal by saying that there were no means of estimating the extent to which infiltration might have reached?

Dr. Woodham Webb has suggested that a possible cause of the implication of the opposite breast may lie in the sympathetic irritability of twin organs, and that the removal by operation of the breast primarily affected takes away a source of danger to the gland of the opposite side in the same way that the removal of a damaged eye, the seat of chronic inflammation, removes the chance of sympathetic ophthalmia.

I have laid stress upon the difficulty that may attend the formation of a diagnosis, and now append some details of a case which was under observation during fifteen years, the disease having existed even some years longer, illustrating this as well as other points of interest.

The drawing given at Plate VI. is that of the breast of a female patient who had been under my care at the Middlesex Hospital. She was admitted as out-patient in 1863. At that time she was forty-six years of age, a widow, and the mother of two children; and she died in 1878. She reported that the disease had commenced four years previous to her admission as out-patient, thus making the duration of the disease extend over nineteen years, fifteen years of which, at least, she was under my observation. My note at the time of admission was "at the outer side of the left breast are two semi-globular nodules; there is induration, indistinct, along the axillary lymphatics; the nodules are connected with a lump as large as an orange." In September, 1864, "some excavation going on." She continued to attend occasionally. In December, 1866, my note

is "alive and comfortable." November, 1868, the same. October, 1869, "well, no sores open; patient getting stout;" but the superficial ulceration recurred. She was admitted an in-patient in 1877 with a state of matters as represented in the plate. Some doubt as to the exact nature of the disease might thus reasonably be entertained, but the death of the patient enabled the post-mortem examination to determine the matter. She died with secondary deposit in the lungs. Microscopic sections of the breast and lung are shown at Plate XVII., viewed with high and low power. These sections substantiated the diagnosis of cancer formed on her admission as out-patient; although, when first seen by me, atrophy of the central part of the breast had so far progressed as to bury the nipple in a deep sulcus, from the sides of which semi-globular, transparent, succulent tumours sprung forth, yet the aspect of the gland was somewhat anomalous.

I was induced again to try sulphurous acid, in spite of my unsatisfactory results in 1869, by what was told me of its use by Dr. Woodham Webb during the Franco-German war of 1870. In the rough surgery of that campaign he found nothing more successful; some of the most frightful wounds healed rapidly with simple irrigations of the dilute acid, and he used it in all his operations and for subsequent dressings. At Metz, where he was installed immediately after the capitulation as Surgeon-in-Chief of the Ambulance, in a large caserne with more than 600 patients, he had full scope for testing the efficacy of sulphurous acid as a disinfectant, these 600 patients having been drafted from the military hospitals on account of the gravity of their condition, and their wounds were, for the most part, complicated with fever, dysentery, and there was much gangrene. Dr. Woodham Webb expressed to me his belief that without sulphurous acid the results of his labours would have been no more satisfactory than were elsewhere obtained; but with it, gangrene came to be completely under control, as is clearly shown by the fact that, of the several hundred cases, most of them undergoing surgical operation of more or less severity, the mortality was only 10 per cent. On one occasion, when the stock of sulphurous acid failed, the aspect of things

changed: in a few hours the gangrene again began to run riot. Carbolic acid dressing was of little or no use, and even sometimes appeared to do harm. When, however, he succeeded in extemporizing a manufactory of the acid, and was again enabled to return to its use, matters righted themselves as quickly as they had previously gone wrong.*

* In addition to this, and to many other clinical facts related to me by Woodham Webb, I was told that neither he, his assistants, nor any of his nurses had suffered from poisoned wounds, although none escaped cuts and scratches; while some of his neighbouring colleagues were laid up with sloughing abscesses, and others died.

Post-Mortem Examination of Twenty-one Cases of Cancer of the Breast which had been under Author's care.

—	—	Head.	Thorax.	Abdomen.	Pelvis.	Axillary Glands and other parts.
M. E. ...	Right breast (removed)	.....	Cancerous deposit on inner side of ribs	Liver fatty	Two small fibroid tumours in uterus	Axillary glands
A. J. ...	Right breast	.....	.....	Tumour in liver	.....	.....
H. G. ...	Right breast	Tumour in head	Nodules of white deposit in lungs	.....	Fibroid tumour in uterus	Axillary glands ....
M. B. ...	Right breast, melanosis	A tumour pressing on some of the bones	Lungs pigmented, bronchial glands black and enlarged	Glands generally enlarged and black	Two fibroid tumours in uterus; mass of black cancer in pelvic tissues	Axillary glands enlarged and black; colour of other glands lighter; skin generally affected
M. S. ...	Left breast	.....	Mediastinal glands, pleuræ cancerous	Liver, spleen, lumbar glands cancerous	.....	Axillary glands
E. T. ...	Right breast	.....	Right lung cancerous	.....	Fibroid tumour of uterus	Axillary glands
C. W. ...	Both breasts.....	.....	Mediastinal glands cancerous	.....	ditto	Axillary glands, and skin of chest and abdomen
H. A. ...	Left breast	.....	Lung cancerous.....	Liver and glands cancerous	Ovaries cancerous	Axillary glands
E. T. ...	Right breast (removed)	Tumour in brain	Nodules in lungs ...	Liver cancerous	.....	Axillary glands
R. P. ...	Left breast	.....	Lungs apoplectic and cancerous	ditto	.....	Axillary glands hard; cancer of skin
M. H. ...	Left breast (removed)	.....	Both pleuræ cancerous	ditto	Polypus of uterus	Axillary glands hard
S. R. ...	Left breast (ditto)	.....	ditto	ditto	.....	.....
B. I. ...	Left breast	.....	Lungs cancerous ...	ditto	.....	.....
M. F. ...	Left breast	.....	Sternum cancerous	ditto	Cancer in uterus	Deposit in skin of axilla
A. P. ...	Right breast, myxoma	.....	Lung cancerous.....	ditto		

J. M.	...	Left breast	Tumour in brain	.....	.....	.....	Cystic tumour in axilla
A. K.	...	Left breast	.....	Pleura thickened ...	Liver 109oz., cancerous	.....	.....
Mr. R.	...	Left breast	.....	Pectoral muscle involved; tubercle in apex of lung	.....	Cancer in ovaries and uterus, and five fibroid tumours	.....
P. S.	...	Left breast; opposite breast also cancerous	.....	Cancer in pericardium and thoracic glands; fluid in left pleural cavity; no cancer in lung	Liver 30oz, spleen 1¾oz.	Fibroid tumour of uterus	.....
M. H.	...	Right breast	.....	30oz. of fluid in right pleural cavity; pleura invaded by growth	Liver cancerous	ditto	Œdema of right arm and leg; axillary glands
— G.	...	Left breast	.....	Nodules in pleura and in lungs; 40oz. fluid in left pleural cavity; recent pleurisy of right side	Liver fatty	.....	Œdema of left arm; axillary glands

Post-Mortem Examination of 102 *consecutive Cases of Cancer of the Breast from Register of the Middlesex Hospital, commencing from the year* 1867.

—	—	Head.	Thorax (Contents of).	Abdomen.	Pelvis.	Axillary glands and other parts.
Vol. 8, 1867						
No. 1 ...	On one side only	.....	.....	Kidney small; granular	Peritonitis.....	Glands cancerous
„ 2 ...	.....	.....	Pleura and lung cancerous	Liver and kidneys small and granular	.....	.....
„ 3 ...	.....	.....	Tubercle of lung; bronchitis	.....	Fibroid of uterus	Glands cancerous
„ 4 ...	... .	.....	.....	.....	ditto	ditto
„ 5 ...	....	.....	Tubercle of lung ...	.....	ditto	ditto
„ 6 ...	.....	.....	ditto	Kidneys large and pale	.....	.....
„ 7 ...	.....	.....	Cancer in pericardium; pyæmic deposit in lung	Liver fatty; spleen congested	Fibroid of uterus; ovarian cancer	.....
„ 8 ...	.....	.....	Cancer of pleura ...	Cancer of liver; kidneys large and pale	.....	Glands cancerous
„ 9 ...	.....	.....	Pneumonia	Pyelitis	.....	ditto
„ 10 ...	.....	.....	Cancer of pleura ...	Liver fatty	.....	ditto
„ 11 ...	.....	.....	ditto	ditto	Thrombosis in iliac vein	ditto
„ 12 ...	.....	.....	Pleurisy.....	Liver fatty; kidneys small and granular	.....	ditto
„ 13 ...	.....	Cancer of brain	.....	.....	.....	ditto
„ 14 ...	.....	.....	.....	Cirrhosis of liver	.....	ditto
„ 15 ...	.....	.....	Fatty heart	Cancerous tumour in liver	Sacculated kidneys; cancer of bladder	.....

Vol. 8, 1868						
No. 16...	.....	.....	Tubercle of lung ...	Liver fatty	Kidney fatty.....	Glands cancerous
„ 17...	.....	.....	Cancer of pleura ...	ditto	.....	ditto
„ 18...	.....	.....	.....	Cancer of liver ...	.....	ditto
„ 19...	.....	.....	Effusion in pleura; emphysema	.....	.....	Bones and glands cancerous
„ 20...	.....	.....	.....	ditto	Thrombosis of iliac vein	Glands cancerous
„ 21...	.....	.....	Cancer of lung	ditto	.....	ditto
„ 22...	.....	.....	Effusion in pleura	ditto	Kidney small and granular	ditto
Vol. 9, 1868						
No. 23...	.....	Cancer of temporal bone	Pleura inflamed ...	.....	Kidney sacculated; fibroid of uterus	ditto
„ 24...	.....	.....	Tubercle of lung ...	.....	Kidney fatty; thrombosis of iliac vein	.....
Vol. 9, 1869						
No. 25...	.....	.....	Cancer of pleura ...	.....	.....	Glands cancerous
„ 26...	.....	.....	ditto	.....	Cancer of ovaries	ditto
„ 27...	.....	.....	ditto	ditto	Cancer of vagina	ditto
„ 28...	.....	.....	ditto	Cancer of liver and spleen	Kidney small and granular	ditto
„ 29...	.....	.....	Cancer of pleura and lung	Cancer of liver ...	Kidneys fatty	ditto
„ 30...	.....	.....	Cancer of pleura...	ditto	.....	.....
„ 31...	On both sides ...	.....	ditto	ditto	.....	Glands cancerous
„ 32...	On one side only	.....	Cancer of lung	.....	.....	ditto
„ 33...	On both sides ...	.....	Effusion...	.....	Fibroid of uterus	ditto
„ 34...	On one side only	....	Congestion of lung	Cancer of liver, omentum, and mesenteric glands	Fibroid of ovaries	ditto
„ 35...	.....	.....	Cancer of lung	Cancer of liver ...	.....	ditto
„ 36...	.....	.....	Congestion of lung	Fatty liver	.....	.....
Vol.10,1870						
No. 37...	.....	.....	Adhesions and effusion	.....	Fibroid of uterus	Nodules in cicatrix
„ 38...	.....	.....	Cancer of pericardium; effusion	.....	ditto	.....

Post-Mortem Examination of 102 *consecutive Cases of Cancer of the Breast from Register of the Middlesex Hospital, commencing from the year* 1867.

—	—	Head.	Thorax (Contents of).	Abdomen.	Pelvis.	Axillary glands and other parts.
Vol.10,1870						
No. 39...	.....	.....	Pleuritic effusion; apoplexy	Cancer of liver; gall-stones	.....	.....
„ 40...	.....	.....	Adhesions.....	Cancer of liver	.....	.....
„ 41...	On both sides ...	.....	Cancer of pleura and lung	Cancer of liver and spleen	.....	.. ..
„ 42...	On one side only	.....	Adhesions.....	.....	Kidney cystic	.....
„ 43...	.....	.....	Adhesions; cancer of bronchial glands	Cancer of liver		.....
„ 44...	On both sides ...	.....	Heart fatty; cancer of pleura and lungs	ditto	Fibroid of uterus	.....
„ 45...	ditto	.....	Cancer of pericardium and lungs	.....	.....	Numerous superficial deposits
„ 46...	On one side only	.....	Pneumonia	.....	.....	.....
Vol.10,1871						
No. 47...	.....	.....	Pericardium, lungs, and mediastinal glands cancerous	.....	.....	.....
„ 48...	....	.....	Cancer of pericardium and lungs	Cancer of liver, spleen & kidney	.....	Glands cancerous
„ 49...	Recurring	.....	ditto	Cancer of liver ...	.....	Ulcer in axilla
„ 50...	ditto	.....	ditto	ditto	.....	.....
„ 51...	ditto	.....	ditto	ditto	.....	Glands cancerous
„ 52...	On one side only	.....	ditto	Kidney cystic ...	.....	.....
„ 53...	.....	.....	Adhesions.....	Cancer of liver and gall-stone	.....	.....
„ 54...	.....	.....	Cancer of pericardium and lungs	Cancer of liver ...	.....	.....

Vol.11,1871 No. 55...	.....	.....	Cancer of pericardium and mediastinal glands	.....	Both ovaries cancerous	.....
Vol.11,1872 No. 56 ...	.....	.....	Cancer of pleura	Liver fatty	.....	Cervical glands cancerous
„ 57...	.....	.....	Cancer of pleura; sternum cancerous	.....	.....	.....
„ 58...	Recurring.....	.....	Calcareous deposits in lung	....	Uterine fibroids; polypus; fundus cancerous	
„ 59...	.....	.....	Aorta atheromatous; mediastinal glands cancerous	Kidney cystic	Fibroid of uterus	.....
„ 60...	.....	.....	Effusion.....	.....	....	Skin and glands of axilla cancerous
„ 61...	Recurring	.....	Adhesions.....	Cancer of liver ...	Dermoid cyst of ovary	.....
„ 62...	On one side only	Abscess of left hemisphere	Calcareous deposit in lungs	ditto	.....	Deposit in skin of chest
„ 63...	.....	.....	Secondary nodules in pleura	Cancer of liver; spleen soft	.....	.....
„ 64. .	Recurring	.....	.....	Cancer of liver ...	Fibroid of uterus	Cancer of ribs .....
„ 65...	On one side only	.....	.....	.....	.....	Axillary glands and skin infiltrated
„ 66...	.....	.....	Aorta atheromatous; pyæmic abscess of lung	.....	Cyst of ovary ...	Sternum cancerous
„ 67...	.....	.....	Cancer of lung	....	... .	....
„ 68...	Recurring	.....	Tumour from lung through diaphragm	Liver displaced...	.....	.....
„ 69...	On one side only	.....	Cavities in lungs ...	.....	.....	Cancer in sternum
„ 70...	.....	.....	Adhesions.....	Cancer of liver ...	.....	Pyæmia; purulent deposit in left wrist
„ 71...	.....	.....	Adhesions; bronchitis	.....	.....	.....

Post-Mortem Examination of 102 *consecutive cases of Cancer of the Breast from Register of the Middlesex Hospital, commencing from the year* 1867.

—	—	Head.	Thorax (contents of).	Abdomen.	Pelvis.	Axillary glands and other parts.
Vol. 11, 1873						
No. 72...	.....	.....	.....	Liver cancerous	.....	Open sore cancerous
„ 73...	.....	Tumours pressing on pons and cerebellum	Atheroma of aorta; cancer of lungs ...	Liver fatty	.....	Glands cancerous
„ 74...	On both sides ...	Fluid in ventricles	Cancer of pleura ...	Liver cancerous	.....	.....
„ 75...	On one side only	Nodules in dura mater	ditto	Liver and stomach cancerous	.....	Pectoral and intercostal muscles
„ 76...	.....	.....	ditto	Liver cancerous...	.....	Ribs cancerous
„ 77...	.....	.....	Lungs cancerous ...	ditto	.....	Sternum cancerous
„ 78...	.....	Rodent ulcer in orbit	.....	Gall-stones	Calcified fibroids of uterus	.....
„ 79...	.....	.....	Lungs cancerous ...	Liver cancerous	.....	.....
„ 80...	.....	.....	.....	.....	.....	Fungating tumour in axilla; humerus cancerous
„ 81...	.....	.....	Adhesions.....	Cancer of liver and kidney	.....	Glands cancerous
Vol. 12, 1874						
No. 82...	.....	.....	Vegetation on valves	Mucous membrane of intestines ulcerated	.....	.....
„ 83...	.....	.....	Adhesions.....	.....	.....	Encephaloid tumour in femur
„ 84...	.....	.....	Sloughing through intercostal spaces	Liver fatty	.....	Axillary and cervical glands cancerous
„ 85...	.....	.....	.....	Cancer of pancreas and liver ($98\frac{1}{2}$ oz.)	Fibroid of uterus	Scar and skin healthy
„ 86...	.....	.....	Nodules in pleura...	.....	ditto	Glands cancerous
„ 87...	On both sides.....	.....	Adhesions.....	Liver cancerous	.....	Skin of chest cancerous

„ 88...	On one side only	.....	Cancer of pleura; tubercle in lung	.....	Cancer of uterus and fibroid tumour	Cancer infiltrating pectoral muscle
„ 89	.....	.....	Lungs and pleura and bronchial glands	.....	Cystic ovary	.....
„ 90 ...	On both sides ...	Fracture of odontoid process; bones of cranium cancerous	Nodules on pleura...	Liver cancerous	.....	.....
„ 91...	On one side only	.....	Large arteries atheromatous	Liver fatty and cancerous	.....	Tissues of chest infiltrated
Vol. 12, 1875						
S. R. } 92 P. M. }	.....	.....	Effusion; heart fatty	Atrophy of spleen	Fibroid of uterus	Ribs cancerous
S. R. } 93 P. M }	On both sides ...	.....	Effusion; bronchial glands cancerous	Liver and mesentery cancerous	Ovary cancerous	Glands cancerous
S. R.. } 94 P. M, }	On one side only	.....	Pleurisy	Liver cancerous...	.....	ditto
S. R. } 95 P. M. }	.....	.....	Pleura cancerous ...	ditto	Fibroid of uterus; cyst of ovary	Axilla infiltrated
S. R. } 96 P. M. }	.....	.....	Vegetation on valves	.....	.....	.....
S. R. } 97 P. M. }	.....	.....	Pleura and lungs cancerous	ditto	Fibroid of uterus	Arm and chest brawny
S. R. } 98 P. M. }	.....	.....	Pneumonia	Nutmeg liver ...	Cystic ovary; polypus in uterus	Axilla infiltrated
S. R. } 99 P. M. }	On both sides ...	.....	Lungs and pericardium cancerous	.....	Ovaries enlarged	Glands cancerous
S. R. } 100 P. M. }	.....	.....	Lungs cancerous ...	Liver, spleen, and supra renal capsules cancerous	Ovary cancerous	Axillary and cervical glands cancerous
S. R. } 101 P M. }	.....	.....	ditto	Liver fatty	.....	Glands cancerous
S. R. } 102 P. M. }	.....	.....	Pleura and spine cancerous	.....	.....	Glands cancerous

PART II.

PATHOLOGICAL AND SPECULATIVE.

In approaching more closely the intimate pathology of Cancer of the Breast, the question arises, how does cancer begin, and how does it spread?

Theories as to the Origin of Cancer.—The theories as to the origin of cancer and its dissemination have essential differences. One theory is that cancer is at first a purely local disease, differing from other tumours by having a certain structural peculiarity, namely, an absence of coherence in the cell-elements favouring its dissemination by a substantial transport of reproductive cells, the cachexia being the consequence of the reaction of the further development of the cancerous disease, and of its progress at the part originally affected. Belonging to this theory is embryonism, which accounts for the initial atom in which the disease commences. Another theory is, that cancer is caused by a constitutional condition; that this consitutional condition engenders, in a certain part specifically prone to undergo cancerous change, the upspringing of the first speck of cancer. From this point there is a divergence of opinion as to the mode of dissemination; one mode implies the substantial transference of the reproductive cancer cells through the lymphatics and through the blood-vessels; the other mode implies the existence of a spermatic influence emanating from the primary focus.

The theory that cancer is at first a local disease only was held by Benjamin Bell, who, writing a hundred years since (1782), said:* "We have elsewhere shown ('A Treatise on the Theory and Management of Ulcers') that cancer on its first appearance is, perhaps, in every instance, a local affection only; that the cancerous diathesis is pro-

* "A System of Surgery." Fifth Edition. Dedication dated 1782.

duced, not by any original affection in the constitution, but by absorption from a local ulcer."

This theory having apparently been shown, by the subsequent universal experience of operators to be untenable, has been of late again put forward as a new one by pathologists who either overlooked or ignored Bell's idea, or who, perhaps, considered that the fresh arguments they adduced justified their again urging its soundness; for example, Mr. Henry Arnott, writing* in 1872, said: "There are two leading views, however, of the nature of cancer which may be briefly characterized as that which regards it as an affection purely *constitutional*, and that which ascribes to it *a purely local* character. Of these two views the latter is by far the more recent; but although it has been warmly adopted by some few English surgeons, notably by Mr. De Morgan and the late C. H. Moore, it cannot be said to be generally welcomed on this side of the Channel, though long held by some of the leading pathologists of Germany."

Mr. Moore† said, "Cancer appears to me to arise as a local disease independently of a constitutional or general cause, first, because of its invariable origin as a single tumour; secondly, because of the manifest dependence of the later tumours upon that first." Mr. Moore expressed and supported his opinion that there exists the possibility of extirpating the first tumour by an "early and adequately extensive operation." He next argued from the remarkable manner in which it is inherited as a local and not a constitutional peculiarity, the disease manifesting itself in the corresponding organ of plural members of one family. He gave as his fourth reason, that cancer has a preference for "the healthiest persons." He said further, "We have to look for the cause of cancer, accepting it as a local disease, in the prior conditions of the structures in which it originates. The local occasion of cancer may be changes induced from without during the course of life in a tissue once rightly formed, or it may reside on a yet anterior condition, an original

* "St. Thomas's Hospital Reports," vol. ii.

† "Antecedents of Cancer," by Charles H. Moore, page 27.

misconstruction of it." "As to the former of these conceivable cases, cancer may certainly in its least virulent and heterologous form come on where there has been prolonged local irritation," but he admitted that "some far more specific occasion is needed to induce a growth of cancer in regard to the second presumed cause of cancer." * * * "This branch of the inquiry is in an unsatisfactory state, and is thus likely to continue as long as we are without the means of observing organs previously to the development of cancer in them, or unable to discern the nature and the amount of the first textural change." Mr. Moore said again, "Cancer is eminently a disease of persons whose previous life has been healthy, and whose nutritive vigour gives them otherwise a prospect of long life." Thus he concludes "that cancer is neither connected with nor dependent on a foregoing morbid condition. * * * Should death happen from any cause from an early stage of the cancerous malady, all the structures of the body are found, as a rule, conspicuously healthy; the organ in which the disease originated is not perceptibly morbid at the parts not yet invaded."

Mr. Simon, in an address at the Midland Medical Society, at Birmingham, November 9, 1877, published February 16, 1878, on "Some Points of Science and Practice concerning Cancer,"* refers to the theory that "cancerous cachexia, like the syphilitic cachexia, is but an affair of *progressive infection*, essentially by the juices of the body the lymph and blood, but sometimes also accidentally in other ways," but that in certain cases of disturbed health presumably this cachexia is the effect and not the cause of the cancer. "Our present ætiological position seems, in short, to be this: In the genesis of the primary cancer we have evidence of two forces—one, the natural growth-power of the texture, the other a power which is at least relatively foreign; and the cancer, which will act zymotically on other organs, expresses the co-operation of these two powers. Whether the process, as regards its unknown factor, depends directly or indirectly on some contagion from the outer world, or is from first to last merely the abnormal play of

* *British Medical Journal.*

forces native to the body, is a question which waits to be solved. In our present imperfect state of knowledge with regard to many of the requisite elements for judgment, it would, I think, be unwise to attribute impossibility to either of the alternatives. In relation to them both, as well as to other conceivable hypotheses of cancer, our scientific need and duty is to continue observing, as accurately as we can, every local and personal and hereditary condition which may seem to act, either attractively or repellingly, on the factor which it is our aim to understand; and of such indications there are already some which I think valuable. Thus, for instance, the fact (above noted) that cancer has marked affinity for organs which are already in certain accidental ways disordered, seems to show that the unknown exciting cause either is not native to the body, or, at least, is not specially an attribute of the texture in which the disease breaks out. And the fact (as it appears to be) that cancer, though eminently contagious from part to part in the affected body, can hardly, if at all, be communicated to any other body, even among animals of the same sort, by artificial inoculations, injections, and transplantations, seems to say—first, that the unknown factor in cancer can only operate where certain general predisposing conditions exist; and, secondly, that cancer is perhaps not an hereditary disease, except as regards those predisposing conditions."

A new explanation of the genesis of cancer, intermediate between the two, is that given by Dr. Creighton. He endeavours to demonstrate that the commencement of cancer, at least in the breast, is a transgression of a physiological process, which ultimately leads to the contamination of the system.

Dr. Creighton says: "Whatever is constitutional is developed from the primary tumour after it has attained a certain maturity, and the constitutional element is represented in the recurrence of secondary tumours. It is superfluous, as far as I can see, to refer the whole cause of cancer to a mysterious constitutional element as long as there are so many vicissitudes of the body, vicissitudes of cellular life, which may be the point of departure of cellular growth. As regards the manner, these

vicissitudes are remarkable. The process of involution and evolution is very extraordinary in itself. * * * I content myself with pointing to the circumstance that there is a considerable weight of evidence for the constitutional element in cancer after it has attained its primary development, or, in other words, that there is in the body after a certain time an influence which may be justly called a spermatic influence, and which is the cause of tumours in distant parts."

This hypothesis has relation with the opinion of Rudolph Majer, that there is often a short step from an inflammatory hypertrophy to a circumscribed hyperplasy, which becomes an infectious growth.

Dr. Franz Koenig, Director der Chirurgischen Klinik in Göttingen, after discussing the various alleged causes of cancer of the breast, says :—"It is easily seen that all this adds little to the real ætiology when, after any of these conditions or injuries, cancer becomes developed; there must be in the tissue a distinct localised predisposition. In many cases this predisposition must be hereditary."*

Cancer being a disease of which the tangible part is the production at certain points of certain forms of growth contrary to the laws which regulate growth in health, the question still remains—Whence does the mandate of disobedience arise? I cannot disassociate the phenomena of the disease from the idea of an antecedent constitutional fault.

In using the word constitutional I use it adjectively with the word condition, as expressing the difference between the condition of the individual before vaccination and the condition of the individual after vaccination; and when I apply the word constitutional to the disease which we call cancer, I apply it in that sense.

The change produced in the organism by its having undergone the processes included in such diseases as scarlet fever, or measles, or small-pox, or cow-pox, by which an immunity from the morbific action of the same poison which produced the disease in the first instance is secured, must be assumed to be a constitutional change;

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* "Lehrbuch der Speciellen Chirurgie," Berlin, 1878, vol. i. p. 666, *et seq.*

can it be argued that the change is local, not having reference to the blood or humours, but to certain other constituent elements of the body? The manner in which vaccination brings about such an altered condition of things as to protect the system from poisoning by the virus of small-pox, although the zymosis which produces this change must obviously commence locally, involves, to my mind, a mechanism so occult that I confess to an utter inability to form any conception of it.

But I would ask, what is the process of involution and evolution which Dr. Creighton describes as very extraordinary in itself but a constitutional process, a process which can only occur in certain conditions of the constitution, that is to say, does not occur before a certain age, and does not occur after a certain age? The process of ovulation is eminently local; but, besides being local, it is eminently constitutional; it is distinctly parallel with the involution and evolution of the mammary gland. We see that if the ovary be removed, as, for example, in ovariotomy, the periodical change of which ovulation is the expression, is declared by a discharge of blood from the stump of the pedicle, if the Fallopian tube be included, and where this has been fixed so as to be involved in the cicatrix of the abdominal wall; and it is the healthy constitutionalism of the normal cell-development of the process of ovulation, or of the process of involution and evolution of the mammary gland, which has its analogue in the unhealthy constitutionalism of the abnormal cell-production of cancer.

Active, rapid growth, unlimited, unrestricted reproduction of non-deciduous cells constitutes the essence of the sarcoma and of its congeners. In cancer we have the almost exactly opposite. The cells which make up a chief portion of the local disease have little coherence, betray an intrinsic degeneration, and do not, in consequence, possess the capacity for building up those enormous tumours which are presented in the varieties of sarcoma.*

* Fig. 1, Plate XX., is a drawing of the structure of a remarkable tumour of the thigh, recurrent after operation; the tumour reached an immense size. The patient was under the care of Dr. J. Austen, of Ramsgate. The drawing shows alveoli, containing

Mr. H. Arnott says ("Cancer: its Varieties," p. 5): "It seems wonderful that a scirrhus carcinoma should ever be satisfactorily removed by operation, its cells having so very slight cohesion compared with that of the elements of most other new growths." The explanation of what Mr. Arnott calls wonderful is to be found in the evidence of degeneration contained within the non-cohesive "cancer-cell"—namely, the conversion of the albuminous matter into oil; this change renders it more than probable that such cells are effete, and that they are incapable of transplantation.

The important bearing of the fatty metamorphosis of the protoplasmic contents of the cell will be appreciated when we see what this fatty change implies. Thus Simon says: "Generally, then, it may be said of uninflamed textures that an extensive presence of oil in them is essentially a sign of weakness or death; that it represents decomposition of the effective material; . . . . that it is virtually of the nature of putrefaction" (Article on "Inflammation," "System of Surgery," edited by Holmes, 1st edit., p. 14.)

An illustration of the fatty conversion of the albumen of the fluid of serum is afforded by an account of a specimen of *lactescent* fluid drawn from *tunica vaginalis testis* which is given by the late Sir William Fergusson in "Trans. Path. Soc. of London," vol. xvi., p. 184. A report on the specimen was made by Dr. George Harley and Mr. Francis Mason. The lactescence was shown to be due to oil globules. Thus it would appear that the solid, crystalline, fatty matter so common in the fluid of hydrocele, derived, doubtless, from the retrograde metamorphosis of the albumen of the fluid, was replaced by fatty matter in a fluid form.

Mr. Arnott again refers to the dangerous nature of the non-coherence of the cancer-cell. He says (p. 23): "The scanty cohesion

finely granular colloid material, separated from each other by lymphoid cells. It is an example of the difference in the history and progress of sarcoma and cancer. Cancer has inherently the tendency to automatic destruction. Sarcoma continues to extend, almost without limit, by the repetition of the same tissue elements, and crumbles down by its sheer bulk; while the cancer begins to be disintegrated by the fatty degeneration of the protoplasm, almost, one may say, from the very beginning.

between these cells further explains this fatal tendency to transplantation to distant organs, being hurried away in the lymph, or blood stream which may reach them." And yet, in spite of this "fatal tendency," no experimenter has transplanted cancer.

In the experiments made with a view of inoculating cancer, may it not be possible that inactive material has been used—material already in a state of decay—while the real dynamical elements have not been included,—that husks have been sown instead of grain?

I made the following experiment in an opposite direction, in order to test the influence of *normal* tissue upon cancerous growth in a patient who presented a number of disseminated cancerous tubercles over the pectoral region connected with the cancer of the breast, which cancerous tubercles appeared as a rule to reach a state of growth and then to become gangrenous and slough out. I selected a tubercle which presented no obvious sign of failing vitality, and, having split this vertically, my colleague, Mr. A. Clark, who carried out the experiment for me, transplanted a healthy skin graft. The graft lived and filled the cleft made in the tubercle, it underwent no development, did not appear to be infected, *neither did it modify the life of the tubercle*, which, following the example, so to speak, of other tubercles that had preceded it, in time became gangrenous and sloughed out. I have never felt justified in attempting to transplant cancerous tissue into healthy tissue. The experiment above detailed would tend to show that there is no poisonous constituent in a cancerous growth.

One difficulty that, at the outset, lies in the way of my accepting the arguments put forward by Mr. Moore, is the fact that a cancerous change may begin not as a tumour or outgrowth of any kind: on the contrary, the change may cause a diminution in bulk of the original tissues; and unless a structure originally elastic, which shall have become hard and shrunken, can be called a tumour, cancer often commences not as a tumour. Again, the dependence upon the first of the later tumours is not always manifest. There are developments of cancer which may be called secondary, which have no apparent depen-

dence upon the first tumour, and, admitting that cancer may extend itself by the migration of infective elements, its appearance at different points of the body, in an individual, may also be due to a special liability of a particular tissue to a particular disease, as, for instance where, after cancer has declared itself in one breast the other becomes affected. We see an analogous election of tissue in syphilis; one patient has the plantar and palmar skin alone affected, another the matrices of the nails, another the synovial sheathes, another the hair follicles.

I may here state that the frequency with which the one breast becomes the seat of cancer, subsequent to the disease having appeared in the other, has been, I believe, considerably underrated (*vide* p. 99, where I have quoted Dr. Coupland's analysis of 89 cases of mammary cancer examined after death, in which both breasts were affected in 19·1 per cent.), so much so as to invalidate any argument based upon the alleged rarity of that occurrence.

The opinion that cancer may be eradicated by an "early and adequately extensive operation," can have no weight nntil a sufficiently early and adequately extensive operation is shown to be practicable, and, as regards the otherwise especial healthiness of those who become the subjects of cancer, the mere outward appearance of healthiness cannot be worth much. A man may drop dead with heart-disease who, a moment before, may have appeared in his usual robust health.

It will be well, therefore, to begin by looking at the physiological processes which go on in the breast, the molecular activity and the course of the molecular movements, the growth, disintegration, and metamorphosis of the epithelium, and the ultimate effacement of functional capacity, and then to examine the reaction in the several tissues that make up the organ—adipose tissue (which has the special relation to the mature gland of being its embryonic rudiment), connective tissue, artery, vein, lymphatic, nerve, limitary membrane, epithelium, integumentary and muscular tissue, and lymphatic glands.

Dr. Creighton has minutely described the changes that take place

in the mammary gland connected with the normal activity of the gland in its maturity. These changes commence in the epithelium of the acini: the epithelial lining of the acini becomes more fully and more rapidly developed, and, so to speak, elaborate. The further changes in this intra-acinous epithelium give rise to the secretion, which process is sustained for a period, according to circumstances: when the activity of the gland is arrested in due course, then arises remarkable alteration in the epithelium within the acini, in the textures outside the acini, and in the lymphatic spaces. The epithelial contents of the acini change their line of exit, and instead of passing into the milk ducts as a secretion more or less perfect, they traverse the wall of the acinus, the limitary membrane, and make their appearance in the inter-acinous and the lymphatic spaces.

In the state of active secretion of the mamma, one must suppose "that each epithelial cell that is used up in the formation of the milk has been at one time a perfect polyhedric cell of a homogeneous or finely granular protoplasm with a central nucleus, and that it has rapidly undergone the cycle of changes whereby its whole substance has been converted into milk;"—vacuolation, page 35.—Dr. Creighton regards the epithelial cell which is subjected to this process (vacuolation) as containing but a fixed quantity of substance. The more of it that is devoted to fluid product the less is the amount of the co-ordinate cellular formation, and *vice versâ*. There is a vanishing point for each of the two factors respectively in the process. The one vanishing point is where everything is fluid, the other where everything is solid, and yet the law of the cell's activity is the same in those extremes as in the intermediate degrees. Both of the vanishing points have an existence; in fact, the perfect formation of milk is the one, and the purely solid product of the epithelium is the other. The one coincides with the full force of functional excitation, and the other with its extreme enfeeblement.

In the alternations from established functional activity of the mammary gland to a resting-state, or total subsidence of function, the changes in the epithelial cells yield, as a resultant, a quantity

of waste material, "useless cell-formation." The waste cells produced "have it in their power to become, and sometimes do become, highly dangerous elements of disease."

The one extreme of the vacuolation process, where the vacuole reaches the maximum, leaving the peripheral or cellular mass at its lowest possible amount, is simply the perfect transformation of the mammary epithelium into milk, which has been called deliquescence; but the other extreme, where the vacuolar product is at its minimum, the endogenous cell-formation and the cellular product at their maximum, is a condition which has an important bearing on its pathology. Dr. Creighton says* "that the excessive production of the lactiferous epithelium ducts, the immediate agents of secretion, their production out of due season, or their retention at, or near, their place of origin, will be found to be among the chief factors in the causation of tumours of the breast; and the mode of their production by endogenous cell-formation furnishes a theory of their heteroplastic nature, or of the nature of the malignancy of the growths which they help to build up."

The epithelial cells of the acini having undergone the process of vacuolation, and completed their journey through the wall of the acinus, make their appearance in the lymphatic spaces, or inter-acinous spaces, in a new guise. They now appear as lymphoid cells, and invade the inter-lobular fibrillar tissue. Dr. Creighton also describes certain "large granular nucleated cells, filled with a bright yellow or golden pigment." These are found as well outside the acini as within, a further evidence of migration; and for the disposal and utilization of the waste cells an elaborate mechanism (the lymphatic system) is called into play—*vide* chapter iii. Part I., op. cit. "The plurality of free round cells in the vacuolated mother-cell, although it is often held to be an essential part of the definition of endogenous cell-formation, seems to be oftener a pathological than a physiological phenomenon."

Dr. Creighton says, p. 135, "There arises the strongest presumption that the cells of the scirrhus are of the same origin and subject

* "Physiology and Pathology of the Breast," p. 25, 1878.

to the same influences as the pigmented cells, which are known beyond all doubt to be the waste products of a feeble degree of the secretory activity;" and he adds "that the cells of scirrhus, although they are in a great part situated outside the secreting structures of the gland, or the remnants of the same, are not all so situated; and further, it is in those breasts that have an enormous development of the interlobular fibrillar tissue—that is to say, in the breasts of women at or beyond the climacteric period—that the scirrhus form of tumour usually occurs." * * * "The pathological activity of the breast is not merely in the way of structural growth; the functional factor is inseparately associated with the structural. The cellular products of the gland, whether under normal or morbid circumstances, are in the nature of things metaplastic;* and if the cellular products of the gland or the waste cells of the secretion aggregate to form a tumour, that tumour is, in the nature of things, heterologous.

"It is the climacteric effacement of the breast that gives the peculiar character to the disease in women, and there are well-marked structural differences in the tumours according as they appear before or after that period. Those that develop after the climacteric years are perhaps the most common, as they are certainly the most intractable. They have figured most prominently among the tumours of the breast, and they have been the real source of ambiguity in the pathology of the organ; that ambiguity depends upon the circumstance that they occur in an organ which is gradually losing or has lost its characteristic structure. Where the normal is vanishing the departures from the normal are elusive. The problem becomes all the more complicated when we consider that the effacement of the mammary structure and function occurs, as it does, in an organism that is still vigorous in all respects."—Page 172.

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* Metaplasia, Dr. Creighton says, is "nothing else than the heteroplasia which we uniformly associate with the paracitism, or malignancy of tumours; the property of metaplasia may be considered as belonging to the endogenous products under all circumstances that may be said to inhere in all cells produced according to the law of endogenous cell-formation, and therefore to the waste cells of the secretion."

Microscopical Examination.—In examining with the microscope a section of scirrhus of the breast, what at once strikes the eye is the occurrence of masses of grouped cells, more or less circular (*vide* Plate XII., figs. 2 and 3; Plate XIII., fig. 1; Plate XVI., fig. 1, for example); besides these grouped cells and beyond their area, are cells having a much smaller size, "lymphoid cells," and surrounding the masses of grouped cells a fibrillar "stroma." Now, the co-existence of these three main features of the section of the breast,—namely, the grouped cells, the surrounding stroma, and the lymphoid cells,—is found in the lymphatic glands of the axilla, which have become cancerous: *vide* Plate VII., figs. 2 and 4; Plate XV., fig. 2; Plate XVI., fig. 2. It is, therefore, seen that this appearance is not due to the acinous structure of the breast, and, moreover, the same grouping of cells is found to obtain in cancer of other parts. The grouping of the larger cells has some peculiar influence on the life of cancer: it may be from the grouping simply, or from the relation of the cells of the stroma. These grouped cells have but slight mutual coherence, and are surrounded by a fluid form of albumenoid material. This albumenoid material, in some cases, is in excess, and the alveoli of the stroma become distended, the cells remaining, notwithstanding, coherent and occupying a more or less central position, as is seen in Plate X., fig. 1, where this condition is most marked. In fig. 3 the degree of isolation of the cells from the stroma is less distinct, but progressing; whilst in fig. 2 the grouping of the cells has hardly taken place — they are seen invading the fibrillar tissue of the mammary gland. The plate is intended to indicate by the letters B, A, C respectively the regions of the breast from which the section was made; it was made from a case in which the upper portion, B, of the mammary gland gave the impression to the touch of being cystiform. At A it was much firmer. On section through the centre of the breast at C, the tissues appeared to the naked eye normal; but on microscopical examination it was seen that the fibrillar tissues were being invaded or infiltrated by the cell growth.

"Among the many and great diversities which Sir J. Paget says may

be observed in a collection of scirrhus tumours of the breast, we must include a certain diversity in the kind of alveolar grouping of the elements. One of the most common forms is that of solid masses of epithelium, three or four cells broad at their broadest part, tailing off into linear rows, and filling up pretty accurately the spaces in the connective tissue; sometimes these solid cords of epithelium become joined with one another by cross branches; sometimes the cells are ranged more in single file than in alveolar groups. Another not infrequent form is that in which a number of epithelial cells lie loosely among fluid in a space of the connective tissue much too wide for them; sometimes the cells show a distinct tendency to range themselves in a more or less orderly fashion round the wall of the space." *

In some instances cancer cells do not present the ordinary grouped arrangement, but seem to have formed within the loculi of an antecedent cystic degeneration. Figs. 2 and 3 are specimens from a scirrhus breast operated on by Mr. Lawson, who kindly gave me the specimen. If this drawing be compared with fig. 1, Plate VIII., which is from a case of cystic disease, also given me by Mr. Lawson, a certain resemblance will be recognised; but in the latter figure remains of normal lobuli are visible.

There are tumours in which similar large cells without the stroma, and without the lymphoid cells, constitute the chief mass of the tumours, and tumours that are infective and more rapid in growth than ordinary cancer. Plate VII., fig. 1, is a specimen from such a tumour. The primary tumour was of the fibula. The lymphatics of the popliteal space, the groin, the mediastinum were all extensively affected; the subject, a girl about 13 years of age, having died from the implication of the respiratory organs in the thoracic deposit.

Lymphoid Cells.—The small cell-element appears to be identical with the *lymphoid cells* of the lymphatic glands; it varies in relative

* Creighton, "Infection of Connective Tissue in Scirrhus Cancers," *Journal of Anatomy and Physiology*, vol. xiv.

amount to the large cells in different specimens and in different parts of the same specimen.

Dr. and Dr. Elizabeth Hoggan make especial mention of these small cells, lymphoid cells or wandering cells, and refer to them as having been derived from the blood-vessels, attracted as it were through the walls by the stimulus to such movement as is given by the cancerous process going on in their immediate neighbourhood. Fig. 3, Plate VIII., shows a preponderance of the small cell-element, only one group of large cells being shown in the section.

Exceptional Arrangement of the Cells.—The arrangement of the large cells and small cells as a secondary affection of the axillary glands, is sometimes exceptional, the grouping of the large cells in alveoli not obtaining. Plate XIII. shows sections of the breast and axillary gland. In the breast the arrangement of large cells in groups is as usual; whereas, in the axillary gland, the lymphoid cells form, as it were, a cortical layer to a medulla of large cells which are not grouped, about the nature of which from their parentage, there could be no doubt. It may be, in this case, that the original lymphoid cells proper to the gland, had been driven outwards by the larger cell-growth imported. These "lymphoid cells," or "wandering cells," or "indifferent cells," appear to take the most active share in the secondary invasion. Plate XI., fig. 1, is a section through the skin of a case where there was general consolidation of the surface of the thorax after cancer of the mamma; this small cell infiltration is seen to be universal. Fig. 2 is a more highly magnified part of fig. 1; and fig 3 shows the lobule of the breast of the side not operated upon, also universally infiltrated with the small cells. I have appended, at Plate XXI., a section through an epithelioma of the lip in illustration of this mode of infiltration between the specific tissue elements of the part; fig. 1, being the section of the entire thickness of the lip; figs. 2, 3, 4, and 5 showing the infiltration of fatty, muscular, follicular, and glandular tissues respectively. The identity with the lymphoid cells of the lymphatic glands is illustrated by Plate VII.,

fig. 3, which is from a specimen of lymphoma of the axillary glands. (Mr. Philip Harper, who removed the tumour, which was of very considerable size, from the axilla, kindly gave me the specimen.) In this figure the lymphoid cells are seen to be the only cell-element.

Changes in Muscular Tissue. — Plate XVII., fig. 1, shows the invasion of muscular tissue.

Fig. 1, Plate XIX., also shows a specimen of invasion of the muscular tissue. The case was one of recurrent cancer in the male breast, under the care of Mr. Lawson in the Middlesex Hospital, who kindly gave me the specimen. On the left of the figure the muscular tissue is seen: a more highly magnified portion being depicted immediately below. The cells are arranged in linear series between the fibres, the transverse striæ of the muscular tissue being almost obliterated. The lymphoid cells are seen everywhere between the muscular fibres, outside the sarcolemma. This condition of the sarcous elements indicates degeneration. M. Cornil has given an almost identical drawing. (Fig. 6, "Du Cancer et de ses Caractères anatomiques.") He says the muscular fibres are destroyed either in undergoing a fatty degeneration or the waxy degeneration described by Zenker.

Fat Tissue.—The line of invasion of the fatty tissue as shown at Plate XVIII., figs. 3 and 4 is seen to be along the connective tissue which separates the specific tissue elements, the fat cells.

Blood-vessels.—The changes that take place in the blood-vessels have been described by M. Cornil, op. cit., and he has given a drawing (fig. 11) showing ampullation of the capillaries in a case of hæmatodes (carcinome hæmatode). He says that the vessels are dilated at the whole of their circumference or at a part of their parietes. He considers cancer hæmatodes to be only encephaloid cancer with an exaggerated development of the vessels with attenuation or complete absence of connective tissue. He also describes the vessels in a cancerous vegetation, in which the capillaries (fig. 21) are also ampullated.

Dr. and Dr. E. Hoggan say that in cancerous infection of the skin

the blood-vessels become dilated and lose their contractile property.

Except in rare cases (as regards the breast) hæmorrhage from any considerable artery does not occur; but hæmorrhage, nevertheless, in some advanced cases may either finally exhaust the patient or give rise to infinite trouble, and it is from the budding capillaries being ruptured that the loss of blood takes place. This development of capillaries in cancer may reach such an extent as to hide the essential nature of the disease. Tumours are seen in which vascular tufts constitute their chief mass; as, for example, the vascular outgrowths from the bladder.

Lymphatics.—Cancer has been described as an infiltrating disease. This term has been applied often in a physical sense, as though the process was one of gravitation, by which the disease permeates the tissues as one of physical infiltration.

The Drs. Hoggan ("Étude sur le Rôle des Lymphatiques de la Peau dans l'Infection cancéreuse," Archives de Physiologie, Paris) describe the infection of cancer through the lymphatic system. They differ from Koester mainly in denying the participation of the endothelial cells of the lymphatics themselves. They say that the cells of the lymphatic wall ultimately become infected by the cancer cells, but are not the primary agents of cancer dissemination; but that cancerous cells of the lymphatic wall infect the wandering cells on the other side of the wall and thus become the focus of the secondary tumour. They give drawings showing the manner in which the secondary tubercles are formed with the changes that take place in the blood-vessels. They say that those parts where the blood-vessels come into intimate relation with the lymphatics are the centres of development in the secondary tumour; that cancerous lymphoid or wandering cells infect the cells of the fixed tissues; that nuclei of the fixed cells alone undergo the cancerous change, and that the nucleus of the cell becomes the new cancer cell.

Mucous Membrane of Stomach.—Dr. Fenwick has described the condition of the mucous membrane of the stomach in cases of cancer,

and he has recorded his observations in "Med. Chir. Trans.," vol. xlviii., page 267, published 1865; and he gives the results obtained from microscopic examinations of the stomach. In 57 cases of cancer he found that the stomach was seriously diseased in 21 cases, and that in 19 cases in which the intestines were examined, the gastric tubes being normal, morbid changes were detected in 18, so that there is "reason to suppose that few cases of cancer die in which serious anatomical change of a non-malignant nature is not present in some part of the digestive canal." The changes of the stomach are most striking in cases of cancer of the breast. Dr. Fenwick does not think that these changes are produced by the action of the tumour. He says the degeneration of the arteries that so frequently accompanies cancer, would seem to show that a common cause is likely to have produced the degeneration as well as the changes in the digestive tube and the cancer itself.

The evidence in favour of the purely local origin of cancer, alleged to be afforded by the occurrence of cancer at seats of continuous irritation, such as chimney-sweep's cancer, or cancer of the lip * from pipe-smoking, (?) of course negatives the embryonic theory; and with regard to these two instances, chimney-sweep's cancer and pipe-smoker's cancer, I may here say, that I have never yet seen a case of chimney-sweep's cancer where the skin of the whole body was not more or less generally affected with small brown sessile warts; the co-existence of these warts with chimney-sweep's cancer having been, I believe, originally pointed out by Sir James Paget. ("Surgical Pathology," 3rd edit. p. 739.) These warts are so very slightly elevated and lightly pigmented that they might easily be mistaken for freckles; the interference with the function of the skin by these growths must give rise to some relative mischief to health. That cancer should, under these circumstances, appear in the

* I have a photograph of cancer in the *upper* lip, taken from a male out-patient in the cancer department of the Middlesex Hospital. It had been operated on twice at King's College Hospital, but it was tolerably certain, I think, that the original sore was the result of syphilitic inoculation.

genitals affords an example of the selection of tissue for the manifestation of a constitutional disorder. If, in cancer of the lip, the irritation of a pipe stem be admitted an efficient factor, it would appear very remarkable that the cancer is almost invariably situated in the lower lip.

Again, cancer, although usually described as constituting a class of tumours, commences sometimes not as a tumour but as a disease of the surface, as is well known—*vide* Case, No. 59, where the patient, a male, had a cancerous tumour, which had commenced as a scaly patch on the sternum. Cancer of the tongue has been seen to follow ichthyosis, a surface disease, and cancer of the breast has followed, or rather probably commenced as, eczema of the nipple.

Mr. H. T. Butlin has given an account of two cases of carcinoma of the breast following eczema of the nipple and areola—"Med. Chir. Trans." vol. lx. p. 153—and there are cases of a similar nature recorded by Mr. Henry Morris—"Med. Chir. Trans." vol. lxiii. p. 37. In vol. lxiv. Mr. Butlin preceded these communications by one in which he referred to Sir James Paget's article in St. Bartholomew's Hospital "Reports on Disease of the Mammary Areola preceding Cancer" (vol. x., 1874), in which he said that a strong opinion exists that the eczema in such cases stands in relation of cause and effect.

Mr. Butlin draws the following conclusions :—

1. That a certain relation existed between the eczema of the nipple and the areola, and the carcinoma of the breast.
2. That one of the first effects of the eczema was to produce proliferation of the mucous layer of the epidermis of the parts affected.
3. That in time the epithelium lining the galactophorous ducts becomes affected in like manner.
4. That the disease travelling along the large ducts reached the smaller ducts and acini, which become dilated and filled with proliferating epithelium, which was at length, so to speak, discharged into the surrounding tissues.
5. That the carcinoma thus formed was therefore essentially a disease of epithelium.

Mr. Morris's two cases proved to be thoroughly cancerous, both having died with widely disseminating secondary cancer. In one of Mr. Morris's cases "the eruption had existed nearly six years, and in the other four or five years before cancer was suspected." In my own experience I have only met with one case of cancer of the breast which had its starting point from "eczema" of the nipple and areola.

Dr. Thin, vol. lix. "Med. Chir. Trans.," gave his researches into the source of newly-formed epithelial cells in cancer of the skin. He says, at page 213, as far as his investigations enable him to judge, the views he holds regarding cancer of the skin are applicable to cancer of other organs. In cancer the nucleus of the epithelial cell undergoes one of two transformations: it withers and falls into pieces, or in a swollen vitreous cell it undergoes the characteristic change that takes place in the cell's substance, but to a less degree apparently.*

Dr. Thin says: "All the changes that I have observed in the nucleus and cell are connected with death and disintegration; of reproduction there is no evidence."

"I have come to the conclusion that an epithelial cell in a cancerous tissue, although it undergoes various changes, never begets another cell or cells. The idea of proliferation has originated, as I believe, in an erroneous interpretation given to certain changes that take place in the nucleus and in other appearances seen in the débris of degenerated cells and nuclei." Dr. Thin describes the fibrillary tissue of the skin, and he says that the lymph channels of this structure must not be confounded with lymphatic vessels properly so-called, and of which they are in the position of radicles.

* Dr. Thin kindly wrote to me under date January, 1881: "In my paper in the 59th vol. of the Medico-Chirurgical Transactions a summary is given at the end of the paper (beginning at the third paragraph, page 210), and to all that is expressed in this summary I still adhere, subsequent experience having only confirmed the views therein expressed. In regard to some minor points referred to in the paper I am not so confident. I doubt more and more whether the sebaceous glands ever give rise to cancerous epithelium; and in regard to the sweat glands, I believe that in ordinary epithelioma of the skin, whilst the epithelium of the duct may probably take its share in the process, I am now disposed to believe that the secreting cells take an action in rodent ulcer (or rodent cancer) only.

At page 202, he says there has never been any satisfactory evidence adduced that this division of the mucous layer is connected with a development of new cells. "In the cancerous process I have found that it is simply a stage in the cell disintegration, and in all the sections I have examined I have never seen any appearance that has indicated a development either by the process which is understood by the term proliferation, or by endogeous cell growth." Dr. Thin says that his opinion is in accord with the opinion of those histologists who believe that the regeneration of epithelium takes place invariably by a special development of colourless blood corpuscles. Later, he quotes the authority of Von Recklinghausen in testimony of the impossibility of distinguishing between colourless blood corpuscles and the first appearance of the cells that will afterwards become unmistakable cancer epithelium. Bearing in mind that Dr. Thin is speaking of the skin in epithelioma, the general conclusions, he says, at which he has arrived at, are that there is an abnormal growth of epithelium and a morbid condition of the fibrillary tissue of the cutis; which of these factors is the earlier to make its appearance, or is the most important, he is in doubt, but he believes that the change in the fibrillary tissue is not due to pressure by the encroaching epithelium. He says further on, that he is not inclined to attribute the disease to a condition that effects the whole blood, because it is a matter of every-day experience, that when a cancerous tumour is removed, in the wound so produced the healing process may be rapid and satisfactory. That he is forced, therefore, to suppose that there is something in the cancerous part which is prejudicial to the formation of new tissue, and whatever that may be it is very probably to the same cause that the degeneration of the previously existing fibrillar tissue is to be attributed. This unknown agent may be a product of the abnormal epithelium; or both the abnormal epithelium and the degeneration of the connective tissue may, as already suggested, be due to a common cause.

Dr. Thin says, "the development of lymph corpuscles into epithelium, when brought into contact with the epithelial cells already existing, being a process that I believe takes place also in healthy

tissue, cannot be considered by me as in itself peculiar to cancer, but the *abnormal extent* to which the process developes is characteristic of the disease. This is shown not only by the increased development which takes place in the immediate neighbourhood of the epithelium, but by changes in lymph cells a considerable distance from it which are of a more or less marked epithelial character." * * * * * "In health I believe that a lymph corpuscle which is in contact with epithelial cells, becomes assimilated with the cells with which it is in contact, and that this is the source of the regeneration of the epithelium, the area in which this change can take place being strictly limited. In cancer, on the other hand, the potential epithelial area extends along the lymph spaces of the adjacent tissue, and the lymph cells that are present in it are subjected to a developmental change that they do not undergo in health, except when in direct contact with normal epithelial structures. These influences, or epithelial infection as it has been termed, may exist both in the fluid and formed element of the affected tissue, but that it is strongly present in the cells may be inferred from the rapid epithelial transformation which rows of cells undergo when they form an unbroken chain which is at one end in contact with the epithelial growth."

Statistical averages, although useful where questions dealing with a large number of cases in the aggregate may arise, such as in life assurance for example, are of little value in prognosis where the task is to form an opinion from the actual condition of the prospects of the patient. Two cases may have appearances in common, as regards the breast, and yet will run opposite courses; nevertheless, I have thought it well to follow the example of others, and append certain statistical details.

Relative Frequency.—The frequency with which cancer attacks the breast, compared with the uterus, I proved to be amongst my out-patients in the Cancer Department more than as 3 is to 1. Out of a thousand cases of cancer in the surgical wards, cancer of uterus stood at 38·9 per cent.; of the breast, 26 per cent.; of the abdomen, less than 1 per cent. From the years 1867 to 1875 inclusive, 1,155 cases of

cancer occurred in the surgical and medical wards together: 32 were of the stomach, showing a percentage of 2·77. Whereas, from the Paris records quoted by M. Salle ("Étiologie de la Carcinose," Paris, 1877, p. 30), out of 1,358 cases, 28·84 per cent. was the proportion of cancer of the stomach, while the proportion of uterine cancer was given as 32·24 per cent.

Mr. Sibley's statistics, published 1859, show for stomach cancer precisely the same percentage as that arrived at by myself (from data commencing eight years afterwards), and for uterine cancer a percentage of 30.

M. Marc d'Espine for the Canton of Geneva gives in 889 cases of cancer 45 per cent. of the stomach, 15 per cent. of the uterus, and 8·5 per cent. of the breast.

From what has been shown to be the statistics of hospital practice in this country, it would at first sight appear that the breast and uterus stand at the head of the list of organs most liable to cancer, and stress has been laid upon this in discussion upon the pathology of cancer, but the same relative frequency is not reported by other observers abroad. M. Salle, in his "Thèse sur la Carcinose," places the stomach at the head of the list. He quotes, at p. 30, the tables of M. Marc d'Espine and of Virchow, who put the stomach at 54·9, the uterus at 18·5, and the breast at 4·3 per cent. In M. Salle's researches into the statistics of the hospitals of Paris, out of a total of 1,358 cases of cancer, 494 were of the stomach and intestines, not including rectum and anus, 441 were of the uterus, and 68 of the breast. He says that the relative frequency in the different organs in the cases observed by M. d'Espine and those gathered from the hospitals of Paris, is the same; that the order of frequency stands thus:—stomach, uterus, liver, breast, rectum, mouth, male genital organs. That there is some discrepancy between the statistics of the French hospitals and our own may partly arise from the fact that the French hospitals include hospitals which are asylums for the aged, and which in their functions correspond more with the poor-house infirmaries. MM. Cornil and Ranvier, placed the stomach at the head of their list, *vide* "Manuel d'Histologie," page 185; but they give no

statistics. They say cancers develop primarily in all the organs * * * "en particulier, l'estomac, l'utérus, et la mamelle." Dr. Bristowe* says, "carcinoma of the stomach is one of the most frequently fatal forms of disease."

My friend Mr. Ambler, of Hemel Hempstead, searched the books of the West Herts Infirmary, and his results were :—breast 12, upper jaw 2, lip 13, penis 1; and 5 cases of epithelioma, all in male patients, the organ affected not being mentioned. The cases of cancer in the lip were all male patients. The preponderance is in favour of the lip, the patients having been probably most of them agricultural labourers. There are three explanations of this circumstance possible, that in this district cancer of the lip is more frequent than cancer of the breast; that the male patients more readily applied at the infirmary; and that the female patients were treated at home, or were sent to a metropolitan hospital as their cases would require a more prolonged and expensive treatment than epithelioma of the lip, which would hardly confine the patient to his bed.

There are several points in connection with this subject with which I do not propose to meddle. That the breast is the seat of cancer with a frequency second to that of the uterus, is sufficiently demonstrated to establish its claim for special consideration.

As to the comparative duration of life, in cases operated on and not operated on, I have not succeeded in gaining sufficient data to justify me in putting them forward in support of the advantages I believe to result from operation in a very large proportion of cases. It is an essential want that the history of cases should be systematically followed up after operation.

I propose to refer to the questions of age, social state, fertility, and lactation, family history as regards longevity, the occurrence of phthisis, gout, and rheumatism, hereditary transmission, regional transmission, and geographical distribution.

The table immediately following, showing liability to cancer at different ages, has been constructed for me by a professional statistician.

* On the "Theory and Practice of Medicine," 1st edit., 1876, page 693.

Age.—Of 160 cases observed by myself the *average* age of attack was 50·4. But an analysis into quinquennial groups, showing the real liability of each age, is as follows:—

Age.	Col. 1. Number of cases observed.	Col. 2. Percentage of total cases.	Col. 3. Mean No. of persons living in quinquennial groups, starting with 100 living at 25-29 (Dr. Farr's English Life Table).	Col. 4. The figures in Col. 2 taken as a percentage upon those opposite them in Col. 3 become	Col. 5. The figures in Col. 4 reduced to a percentage of 100 cases. (showing relative liability at each period of life).
25–29	2	1·25	100·	1·25	·831
30–34	9	5·625	95·035	5 919	3·933
35–39	19	11·875	89·831	13·219	8·783
40–44	25	15·625	84·326	18·529	12·311
45–49	34	21·25	78·409	27·101	18 006
50–54	28	17·5	71·947	24·323	16·161
55–59	13	8·125	64·513	12·594	8·368
60–64	13	8·125	55·679	14·593	9·696
65–69	10	6·25	45·232	13·818	9·181
70–74	4	2·5	33·331	7·501	4·983
75–79	2	1·25	21·168	5·905	3·923
80–84	1	·625	10·861	5·755	3·824
	160	100·000	...	...	100·000

Thus, the liability at age 45–49 is more than double that at age 35–39; at age 70–74 it is about six times that at age 25–29; at age 55–59 about ten times that at age 25–29, and so on.

Mr. Sibley gives the average age at the time of attack in 153 cases as 48·6 years. The earliest age of attack among those in my Table was 28 years, and the latest 82 years. Mr. Sibley gives the earliest age as 26, and the latest 84.

Of 1,000 cases taken from the consecutive in-patient records of the Middlesex Hospital the average of ages appears to be thus: of the 260 cases of cancer of the breast the average age was 49·8. Of the 389 cases of cancer of the uterus the average was 45·7. Of the 351 general cases the average age was 53·7. Of these general cases it may be here mentioned that 243 were in men, 108 in women.

The averages recorded by Sibley are,—average age at the time of attack, 153 cases of cancer of breast, 48·6 years as just stated; average age at the time of attack, 119 cases of cancer of the uterus, 43·28 years.

It would thus appear that cancer developes in the uterus earlier than in the breast, and in the breast earlier than in other parts taken collectively, the majority of the cases of cancer other than of the breast and uterus, it is to be remembered, occurring in males.

Social State, Fertility, and Lactation.—Of the above-named 160 cases, 22 were single and no children, 138 were married: of these 51 were sterile, 87 had children, having on an average 5·5 children. Of these 10 had 1 child only, 5 had 10 children, and 2 had 15 children.

It has been thought that dereliction of lactation has been one of the causes of cancer. There is no proof of this avoidance of a function being injurious in the direction named. It would be more likely, I believe, that too prolonged lactation might predispose to the development of the disease. I saw, with Dr. Ring, of Kilburn, a lady suffering from cancer of the breast who had always nursed her numerous children during ten and eleven months.

Family History—Longevity.—The fact of longevity in the families of patients with cancer of the breast is often striking. Out of 169 cases of parents observed by myself the average age of the fathers was 62·25, the average of the mothers 61·53; 106 patients had grandparents who had lived to be more than 70 years old, 62 had parents who had lived to be more than 80 years old; 15 had grandparents known to have lived over 90 years. Of the grandparents of the 169 patients (who would number 676,) 133 lived to be over 70 years of age, 89 were reported as simply old, 38 died between 40 and 70, and 42 died young; that is to say, under 40 years of age. Concerning the remainder, the facts were unascertained, it frequently happening that the patients were unable to give any details respecting their relatives.

The Occurrence of Phthisis.—Out of 160 cases phthisis was traced in relatives in 36 cases. This is somewhat less than the frequency noticed by Mr. Sibley, who found 48 instances of the occurrence of phthisis in 130 cases.

Gout and Rheumatism.—In 160 cases gout and rheumatism were traced in 15 as follows:—In fathers 4, mothers 3, brothers 5, daughter 1, other near relatives 2.

I derived the following history from Mr. B——, the father of one of my pupils, himself an experienced medical practitioner:—

Mr. B—— informed me that his father died aged 91. Mother died aged 87. He had three sisters who died of cancer. One, aged 45, cancer of the breast and stomach; one, aged 54, cancer of the mouth and stomach; and one, aged 65, cancer of the stomach and liver, and scirrhus of the breast. There were seven in the family, four sons and three daughters. One son died of gout, one son died of (suspected) malignant disease of the liver, and the remaining two sons were gouty.

Two ladies, *twin sisters*, 43 years of age, have been under my care, one with cancer of the breast, from which she ultimately died, and the other with obscure abdominal tumour independent of the uterus, which disappeared after her confinement at the full period, she having been some months pregnant at the date of my first seeing her. She is now alive, but suffers much from rheumatism.

Hereditary Transmission.—Of 1,000 in-patient cases of cancer generally from the registers of Middlesex Hospital about 16 per cent. give information as to the existence of cancer in their families.

6 Fathers.	7 Uncles { Paternal, 5. Maternal, 2.
43 Mothers.	
4 Brothers.	43 Aunts { Paternal, 18. Maternal, 25.
30 Sisters.	

In 160 cases of cancer of the breast observed by myself, and observed with all the care I was capable of, cancer was traced among the relations in 47 cases, or 29·3 per cent.:—

15 Mothers.	9 Cousins.
1 Father.	1 Maternal Uncle.
5 Grandmothers.	5 Maternal Aunts.
4 Brothers.	4 Paternal Aunts.
2 Sisters.	1 Paternal Great Aunt.

Mr. Sibley states that of a total number of 305 cases cancer was traced in the families of 34, one instance being somewhat doubtful. Cancer was therefore traced in 11·1 per cent.

According to the comparison of my cases and those recorded in hospital registers the proportion of mothers affected is more than double, 43 cancerous mothers having been met with in a thousand cases; whereas, if the proportion met with by myself obtains generally 93 would have been found.

The following remarkable family history I gained from a private patient:—Mr. F——, under treatment for perforating ulcer of the septum of the nose, informed me that his mother died of cancer of the breast, aged 50. A maternal aunt died of cancer of the breast, aged 63; she was unmarried. A second maternal aunt died of cancer of the breast, aged 69, unmarried. One maternal aunt had tumour (?) of the womb, nature unknown. She died, aged 55. Maternal grandfather died, aged 63. Maternal grandmother died, aged 80. Mr. F.'s mother was the seventh of a family of eight.

Regional Transmission.—With regard to the transmission of cancer in the same region, out of the fifteen instances of cancer of the breast, where the mother of the patient had suffered from cancer, the uterus was the organ affected in seven; the breast in three; the eye in one; the tongue in one; the throat in one; the finger in one; the face in one.*

The frequent occurrence of fibroid tumours of the uterus in connection with cancer of the breast is a fact which demands notice. In reference to the tables of *post-mortems* of 21 of my own cases of cancer of the breast, it will be seen that more than a third had uterine fibroids; while of 102 cases from the *post-mortem* registers of the hospital of cancer of the breast, 17 uterine fibroids were found. Adding the series together we have an average of 20·3 per cent. I was consulted lately by a lady whom I had attended nearly twenty years since with a fibroid of the uterus. The fibroid was removed by an obstetric physician, under the advice of the late Mr. De Morgan.

* This does not accord with the statement of Mr. Moore, quoted at page 138.

The specimen is in the museum of the Middlesex Hospital. She has since died of secondary cancer of the nervous system following non-ulcerating scirrhus of the right breast.

Geographical Distribution.—The place of *birth* of 1,030 consecutive cases admitted into the Middlesex Hospital with cancer has been recorded, and the results of the analysis of the record is as follows:—

335 were born in London.

588 in the various counties of England (as below specified).

20 in Wales.

13 in Scotland.

53 in Ireland (19 being from County Cork).

21 abroad and at sea (1 in Canada, 2 in Jamaica, 1 in Calcutta, 1 in Malta, 1 in the Isle of Ascension, 1 in France, 1 in Belgium, 2 in "Germany," 1 in Bavaria, 1 in Mecklenburg, 1 in Holland, 3 in America, 5 at sea).

Northumberland	5	Norfolk	23
Durham	7	Suffolk	23
Cumberland	4	Essex	45
Westmoreland	1	Hertford	25
Yorkshire	12	Bedford	12
Lancashire	10	Buckingham	20
Cheshire	4	Oxford	16
Derbyshire	4	Berkshire	37
Nottinghamshire	8	Wiltshire	20
Lincolnshire	11	Somerset	20
Shropshire	4	Devon	22
Staffordshire	4	Cornwall	12
Leicestershire 3, Rutland 1	4	Dorset	14
Hereford	4	Hampshire 29, Isle of Wight 1	30
Worcestershire	3		
Warwickshire	11	Surrey	19
Northamptonshire	13	Sussex	42
Huntingdon	2	Kent	62
Cambridgeshire	11	Middlesex	24

The accompanying map will aid in appreciating the bearing of the above figures, as regards England and Wales.

Mr. Moore ("Antecedents of Cancer," pp. 42, *et seq.*) searched into the places of *death* of the cancerous. He says, in the year 1861 one of every 30 deaths of females in the south-eastern division was due to cancer; while in the north-western, one in every 59. "If the country be divided by a line from Bristol to Peterborough the mortality from cancer in the five southern divisions is considerably in excess of that on the north of the line." The region of greatest mortality from cancer is thus seen to be most fertile as its *birthplace*.

I have, however, to refer to the remarkable researches of Mr. Haviland in the geographical distribution of disease, and I quote from his paper referring to the distribution of cancer in England and Wales, which, I may add, was illustrated by maps, well worthy of attentive study. Mr. Haviland says :*—"Now the facts elicited by geographising the distribution of cancer in families are simply these. 1st. That the mortality from this cause is highest in those districts which skirt the banks of the rivers of our country which are seasonally flooded. The Thames runs through a vast cancer field; in fact, throughout England and Wales there does not exist an important river, subject to seasonal floodings, that does not flow through high mortality districts. This was an unexpected fact. Having ascertained it, however, I studied the physical and geological characters of the districts where cancer did not thrive, and I found that all these districts were characterised by being high and dry, and geologically composed of non-retentive soils—permeable soils and subsoils in fact. After discovering the first fact, it was natural that the second should follow, and so it did.

"The high, dry sites on the older rocks are the places where cancer does not thrive, and it does thrive in the vales by the sides of the large rivers which overflow their banks, and in the neighbourhood of

* Abstract from paper on the Distribution of Disease popularly considered, by Alfred Haviland, M.R.C.S.E. Society of Arts, Jan. 29, 1879. *Vide Journal of the Society of Arts*, No. 1,367, vol. xxvii.

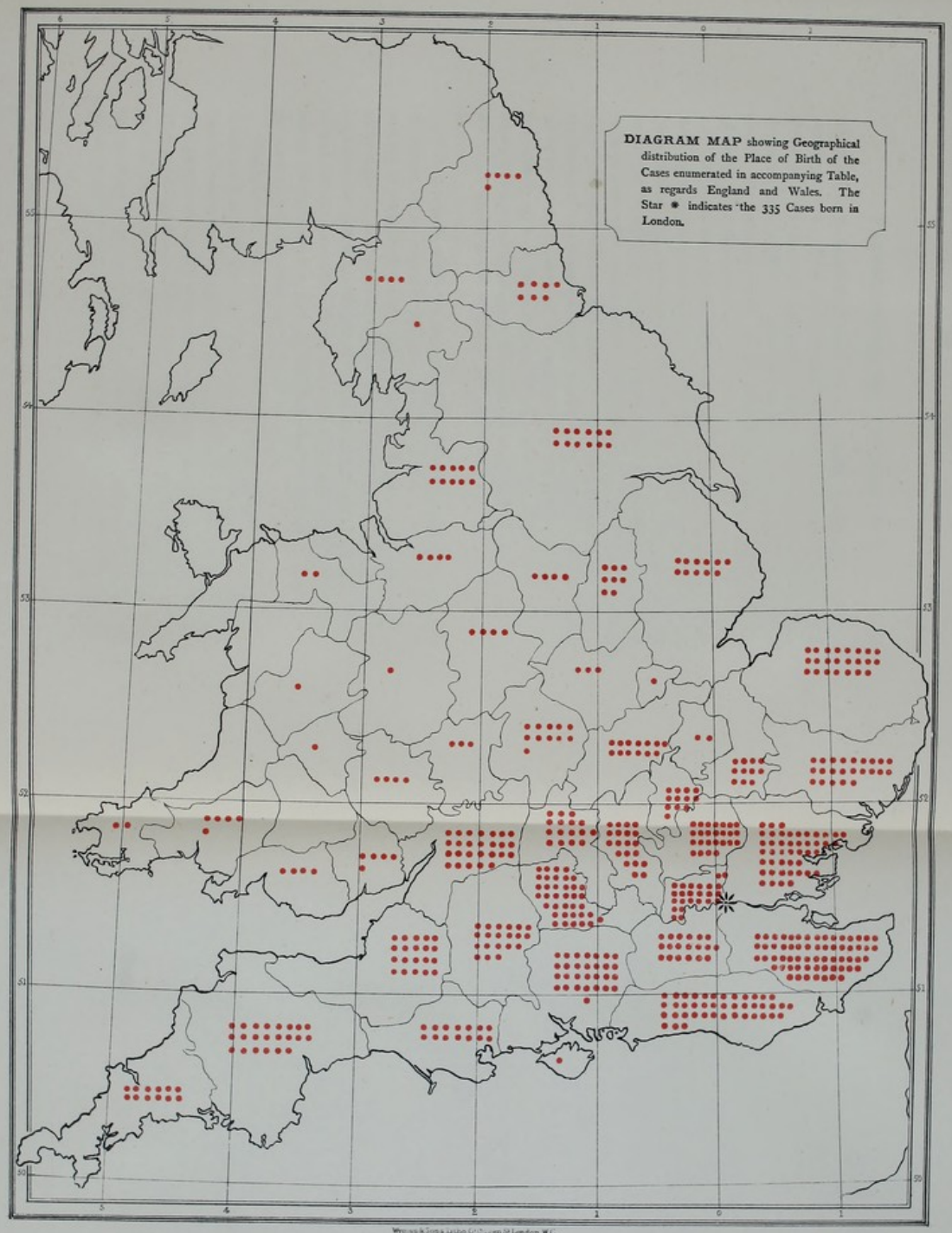
DIAGRAM MAP showing Geographical distribution of the Place of Birth of the Cases enumerated in accompanying Table, as regards England and Wales. The Star * indicates the 335 Cases born in London.

which are to be found the drifts of ages of washings from the inhabited country above. With such knowledge, it would follow that whenever there is a tendency to cancer, the sufferer should be removed to high, dry sites, and, perchance, if whole families were thus to migrate, we should not have so much of the hereditary character of cancer, or of many other diseases.

"We never hear of ague being hereditary. Father, son, and grandson have ague one generation after another, whilst living in an ill-drained fever district, but send them to the hills and their plague disappears; so may it be with the mother, daughter, and grand-daughter afflicted in their lives with cancer, whilst living from generation to generation under the same climatic conditions, on the same geological site, and on the banks of the same seasonally flooded river. It is therefore worth while to try the experiment of emigrating to the higher regions, where the underlying rock easily throws off the rain that falls upon it, and where the natural drainage is all-sufficient, especially as these localities are often to be found within a few miles of even the worst cancer fields.

"It is a fact, which we cannot despise, that up to the present date we know of no cure for cancer; in fact, so far as treatment or a remedy is concerned, we are simply waiting for some such lucky chance as brought to our hands quinine as a cure for ague. Not being able to cure this dire disease, it becomes all the more necessary that we should endeavour to prevent it. We have, therefore, to discover what localities favour its development, and on the other hand what is the nature of the sites on which it does not thrive."

The following conclusions amongst others are given by Dr. G. Salle in his work already quoted, "Étiologie de la Carcinose." That cancer has its maximum of frequency from forty-five to fifty-five years; it is most frequent among women, especially in the organs of generation. The mortality from cancer varies from six to eight per cent. of the general mortality; the stomach, uterus, liver, and the breasts are the organs most frequently attacked, in the order arranged. There is not, either in constitution or temperament, anything which predisposes to

or which protects it from cancer; heredity exercises an unquestionable influence; cancer is more frequent in the centres of population than in the country; depressing moral influences have real causative result; contagion of cancer is possible, although it has never been demonstrated; and he declares that cancer is distinct from its very origin, and does not proceed from the degeneration of tumours of another nature. Dr. Salle states these as his conclusions, having already declared, page 87, that for his part he ranges himself on the side of the localists, supported by the opinion of such men as Velpeau, Virchow, De Morgan, and many others.

Dr. Salle's essay was published in 1877. I will now give an epitome of the opinions that have been held during the preceding ten or twenty years, as follows:—

Cruveilhier, Paris, 1864, says cancer is a disease characterised by the production in the normal tissues of a heteromorphic parasitic tissue (cancerous tissue) emplanted as a parasite in the organism, and having the property of assimilating and transforming into its own substance all the tissues which it invades. It is not a local lesion, but a general disease, with local manifestations.

Robin and Littré, "Dictionary of Medicine," 1865, say that the name of cancer has been given to tumours more or less malignant without due reference to the elementary anatomical characters of the tumour itself, and of the tissue in which it is developed. The name of cancer has, thus, anatomically and pathologically, no other than an historical value. A cancerous tumour is a disease of a special morbid tissue—heteradenic tissue.

August Foerster, "Pathological Anatomy," 2nd edition, Leipsic, 1865, says that carcinoma is a form of growth in which all forms and sizes of cells are to be found, as, with the exception of a few varieties, the cells are limited neither to a defined size or form nor to an exclusive type of arrangement; most usually the cells lie accumulated in a fibrous stroma generally alveolar. The new formation often proceeds from the connective tissue; but besides the connective tissue-cells, the nuclei of the capillary vessels, and of the muscular

fibres may constitute the basis of the new formation, while probably epithelial and glandular cells very seldom give cancer elements by their proliferation. The increase of growth of cancer is by division of the cells, less frequently by an endogenous cell-formation, with a corresponding new formation of connective tissue vessels and by proliferation of the cells of the connective tissue.

FOLLIN, "Surgical Pathology," 1866, says cancerous elements do not proceed from proliferating normal cells, but from a blastema filtering through the walls of the capillaries, and that the propagation of cancer takes place by deposit of a cancerous blastema in the interstices of normal tissues; by progressive atrophy and disappearance of these tissues; and that extension follows in the direction of least resistance.

CORNIL, "Du Cancer et de ses Caractères Anatomiques." Paris, 1866. Facts, to which no objection can be made, have given us the opportunity of deciding that mammary cancer very often begins by an excessive production and hypertrophy of cells in the lobules and glandular ducts at the same time that nuclei and cells spring up in the connective tissue which separates the acini of the gland. Robin has for a long time regarded cancer of the breast as a modification of its parenchyma, and I have myself described the alterations which the ducts and acini undergo. The acini, still enclosed by a layer of membrane, are filled by the over-exfoliation of epithelium, of a pavement or spheroidal form, while outside, in the connective tissue, large round or oval nuclei show themselves. These become in their turn cells, the proper tissue of the gland wall is absorbed, and an entire acinus ends in being nothing more than a meshwork of laminated tissue, the interstices filled with cells originating at the same time in and around the terminal ducts. In other words, the modifications of this tissue end in the typical structure of cancer cells in a fibrous network. In the milk tubes a corresponding increase of epithelium takes place; the tube space is filled and distended long before its resisting walls give way and are destroyed. And the result is, that in breast cancers, which have been several months or a year in growing,

the milk ducts are found choked with a milky fluid, composed of large cells, irregularly pavemented, often in a state of fatty degeneration, and in this case the contents of the ducts are caseous, more or less consistent, and yellow. In the early stage of most cancers of the breast, when the cut surface is scraped and the liquid which exudes is examined, the microscope shows full and anastomosing filaments or moulds of the disfigured acini and ducts. Robin and Bilroth have both noticed this fact. These cylinders are composed of nuclei, or pavement, or cuboid epithelial cells, all of the same size. They form in the cylindrical spaces which serve to give them shape, but have no longer any proper glandular membrane.

The central part of one of these tumours is usually more opaque and yellow than the external part. In the centre, where development commenced, the cells begin to undergo fatty degeneration, while the newly-formed cells near the circumference give to this part a certain degree of transparency. In sections of the opaque parts under the microscope, all the cells of which the bundles of filaments are made up, are seen to be granular, and filled with granular fat. Being aware of this peculiarity, the naked eye can often recognise its presence in the section of a tumour. Very fine yellow lines can be traced, and even squeezed out as little worm-like filaments. These anastomosing or radiating yellow lines are the filaments first noticed, with the fatty change going on. Thus cancerous tumours of the breast always show a certain opacity towards the centre, where there are also yellow patches, sometimes softened, while the younger external semi-transparent tissue continues to increase in pushing out a sort of buds or spherical masses, which are sometimes adherent to the primitive tumour, and sometimes spread themselves out in an isolated fashion among the neighbouring tissues. It is in studying these knots or little secondary tumours, which rapidly follow the growth of a mammary scirrhus, that we learn the mode of origin of cancer in these tissues.

Uhle and Wagner, "General Pathology," 1868. Cancer is essentially formed by cells, which more or less resemble epithelial cells, gland cells, and white blood cells. Common cancer is a cancer

of the connective tissue, and proceeds from changes of the median germinal layer, especially from the connective tissue, and that the cells originate by subdivision of the corpuscles of the connective tissue, or of analogous tissues, and that their increase is by division and endogenous formation, as well as by the development of new cells in the stroma, that the increase and growth is chiefly peripheral, the neighbouring tissues transforming themselves layer after layer into cancer.

Cornil and Ranvier, "Pathological Histology, 1869. The stroma is the essential constituent of carcinoma. It has a continuous framework forming fibrous chambers (alveoli) connected with each other, each containing plasmatic cells, and being furnished with arteries, veins, and capillaries. The alveoli communicate with the lymphatic vessels; this connection with the lymphatic vessels is the cause of carcinoma producing most easily lesions of the lymphatic glands. They consider that the alveoli are formed by the enlargement and anastomosis of the plasmatic spaces of connective tissue, the cells increasing by proliferation. The difference of epithelioma from carcinoma is that in epithelioma the type of cells is epithelial, while in carcinoma the type is that of the connective tissue-cell.

Köester, Würzburg, 1869, says, carcinoma is a tumour proceeding from the epithelium of the lymph vessels, and he has described cancer of the skin. He says that the skin cancer is formed by a stroma of connective tissue, and of epithelial cells connected in an anastomotic form as cell-cylinders, similar in shape to the lymph vessels themselves, and that the cell-cylinders, in fact, represent casts of the lymph vessels; that the further formation of cancer cells takes place by the simple cell division of the epithelial cells of the lymph vessels; that by changes produced in the connective tissue, cellular elements of the type of connective tissue penetrate between the cancer cells; that there is besides the cell accumulation, a gelatinous infiltration of the connective tissue; and that on the further increase of the disease the connective tissue is more and more compressed, and often disappears. He thinks that the first impulse to the morbid proliferation of the epithelium of the lymph vessels is given by

coagulation (of lymph) in the lymph vessels themselves. (Compare with Drs. Hoggan.)

Professor Lücke, 1869, who wrote again in 1876, is an adherent to the theory that every kind of tissue proceeds from a different germinal layer, and that the different kinds of tumours are diseases of the corresponding tissues and cannot proceed from other tissues. That carcinomata proceed from the epithelium. He says that carcinoma is an atypic epithelial tumour, *i.e.*, a cancer arises where a new formation proceeding from epithelium trespasses the limits of the physiological type. In cancer of the breast the disease proceeds from the glandular epithelium. The cells of the secondary formations preserve the character of the primary tumour.

Professor Gusserow, "Sammlung Klinischer Vorträge," No. 18, 1871, defines cancer to be atypic epithelial growth.

Rudolph Maier, "Pathological Anatomy," Leipsic, 1871, says that an adenoma is a simple increase of epithelial cells in bulk and number, differing from carcinoma in having no infective power. Epithelioma is a hyperplastic new formation of epithelium, occurring mostly where there is normal epithelium, but where also it exists pathologically. There is often a short step from an inflammatory hypertrophy to a circumscribed hyperplasy, which becomes an infectious growth, and thus every adenoma and epithelioma may become a carcinoma. He says, there is no essential difference between carcinoma and cancroid. A large part of the new epithelial cell-formation is produced by the division of the existing elements. Some epithelial cells also proceed from the cells of the connective tissue.

Professor Waldeyer, "Sammlung Klinischer Vorträge," No. 33, 1872, says that carcinoma is the atypic epithelial new growth. It is an uncircumscribed, irregular, new formation, the constituent parts of which differ in bulk, form, arrangement, &c., from all normal epithelial formations, and follow none of the organ or tissue types. The stroma is especially the conductor of vascular supply. The cancer cells proceed from pre-existing epithelia of the body, while the stroma proceeds from

the connective tissue layer. He is in favour of the theory of the entire independence of each tissue, so that there are not only primary groups of independent tissues, but also sub-groups, *e.g.*, one kind of epithelium cannot change itself into another kind of epithelium. He admits no difference between carcinoma and epithelioma. He says, primary cancer does not generally appear as a distinct tumour, but as a neo-plastic change, a degeneration through the irregular growth of the epithelium and the conversion of the connective tissue into a stroma, and that thus we may consider primary cancer as an irregular hyperplasy of an organ, while the secondary formations are distinct from the surrounding tissues which they press and destroy, and on which they lie as a kind of destructive parasitic organism. He considers that the dissemination of cancer is chiefly by the property of the spontaneous movement of the cancer cells, and their migration along the lymphatic canals.

Rindfleish, "Pathological Histology," Leipsic, 1873.—Carcinoma is a pathological heteroplasy, the fundamental process of which is an abnormal growth of epithelial tissue into the sub-epithelial stratum of connective tissue, or into the interstitial connective tissue of glands.

Desprès, "Dictionary of Medicine and Therapeutics," by E. Bouchut and Desprès, Paris, 1873, says that cancer is an aimless excess of development, in which ill-organised tissues become altered, and by absorption infect the organism. That cancer is a diathesis is proved by hereditary resistence to extirpation, reproduction in neighbouring glands, absorption by the lymphatics and dissemination in the viscera producing a general cachexia.

Wolfberg, "Virchow's Jahresbericht," 1874, says that the cells of mammary scirrhus proceed from the gland epithelium, the epithelium of the acini. The alveolar stroma is derived from the interstitial connective tissue, and that he could not prove participation of the endothelium of the lymphatic vessels in the cell-formation.

Von Nussbaum, "Krebs vom Klinischen Standpunkte." München, 1875.—I. Cancer is an epithelial overgrowth, most prone to occur in old age, and especially in organs and tissues where there is a predisposition

already that way, *e.g.*, in warts which have been subjected to constant irritation, which, however, does not advance to inflammation, *e.g.*, cancer of the uterus in prostitutes, and in places minoris resistentiæ.

II. It is *not* congenital or hereditary, though, no doubt the tendency to epithelial overgrowth may be and is hereditary.

III. It is *not* infectious, no nurse ever caught it from a patient, no surgeon has ever infected himself with cancer by cutting or pricking his hand during an operation. If cancer tissue be given to cats to eat, they are not a bit the worse for it; if cancerous blood or even matter be injected into the cellular tissue of an animal, the most that results is a circumscribed abscess. If, however, cancer juice be injected into *the veins* a cancerous growth of similar character arises wherever, *i.e.*, in the smaller vessels the juice is arrested in its course.

IV. Cancer is at first a purely local affection and not a constitutional disease.

A cancerous tumour like any other tissue discharges the products of its modifications into the blood. So long, however, as the tumour remains *undegenerate and does not ulcerate* these products are as *harmless as* the products from healthy connective tissue or epithelium. It is a matter of every day experience that patients, in whom a cancerous tumour is growing and increasing, look and are, apart from that, absolutely sound and healthy. When, however, the cancerous nodules break down, when a stinking discharge is formed and absorbed, then we get those constitutional symptoms, *i.e.*, yellow skin, stinking breath, fever, languor, and anorexia, which we call *Humoral infection.* But even this must not be regarded as a *cancerous* cachexia; for it differs in little from any other humoral infection, *e.g.*, of gangrene of foot, or of stinking joint disease. Remove your gangrenous foot, resect your carious joint, and all these symptoms disappear, and so do they when the cancerous tumour is removed. No doubt this humoral infection from cancer may advance very far and even threaten life, but still it is not a *cancerous* cachexia, and so far from contra-indicating an operation calls for it loudly. When, however, the ulceration invades the walls of the blood-vessels, so that

particles of cancerous matter are carried into the circulation, stick, and lodge where the vessels are small or bifurcate, and give rise to secondary masses which run the same course, *then* we have the cancerous cachexia, and an operation can do no good.

Broca, "On Tumours," Paris, 1876.—Cancer is a heteromorphous production. The cancer tumour is constituted by specific elements and by adventitious elements. As in the case of any other tumour under a morbific cause, an abnormal blastema is exhaled in which new elements become formed. There are as many pathological blastemata as there are different kinds of "accidental" formations, either homœomorphous or heteromorphous, and this production of pathological blastemata is in a certain relation with the region where the tissues were distributed in the embryonic period, and maintained subsequently. Besides the local diathesis proper to each tissue, there is a general diathesis or condition of the organism preceding the first appearance especially of cancerous tumours. The diathesis produces the primary cancer, the primary cancer produces the general infection, the general infection produces secondary multiple tumours, cachexia, and death. The primary cancer invades the organism by absorption of the blastema, or by direct inoculation through ulcerated veins.

Schulz, "Archives of Medicine," 1876, says that there is more than one tumour answering histologically to the clinical conception of cancer. Endothelial carcinoma arises in the lymphatic vessels and proceeds from their endothelium. When epithelial cancer cells invade the lymphatic vessels, and there multiply, they never become transformed into endothelial cancer.

Bilroth, "Lectures on Surgical Pathology," New Sydenham Society, London, 1878, says he believes firmly in the strict boundary between epithelial cells and cells of connective tissue, althongh Waldeyer has described carcinoma as an atypical epithelial new formation. Bilroth has further to remark, in cancerous tumours, the presence, in addition to the epithelial cells, of a great number of other small round cells infiltrated into the portion of the tumour composed of connective tissue, and which are the result of a kind of reaction.

The epithelial cells and the basement membrane from which they grow and draw their nutriment are in close relation to each other, and it is conceivable that the first impulse towards atypical adenoid exuberant growth may be furnished by a state of irritation of the epithelial basement membrane. It is, however, equally probable that the exuberant epithelial growth is the first formative process in the development of carcinoma. He thinks that it is scarcely conceivable that the resemblance of the cells in the secondary formation can arise otherwise than by transportation of cell elements.

I have to thank Dr. J. W. Browne for kind assistance in translation from the German.

It will have been observed that I have quoted largely from the writings of Dr. Creighton. His researches into the ætiology of cancer, undertaken by the direction of the Medical Officer of the Privy Council, offer a new point of departure in pathology. Dr. Creighton has supported his ingenious hypothesis step by step by minutely described observations, to which, I fear, that in spite of the large quotations, I have failed in doing justice.

I have, in the same way, also to refer to the valuable researches of Mr. Butlin and Dr. Thin, who so carefully describe the intimate pathological changes in epithelium and other anatomical elements in cancer.

APPENDIX.

ABSTRACT OF THE DISCUSSION ON CANCER AT THE PATHOLOGICAL SOCIETY, 1874.*

Mr. De MORGAN, admitting the want of sufficient and accurate data on which to base argument, said that practically he agreed with those who would regard any infecting growth as a cancer, and he believed that whatever argument applies to the subject of the origin of cancer applies equally to that regarding the origin of any infecting tumour—perhaps of any true tumour—be its nature what it may; but he believed *that the structural peculiarity of cancer is a main factor in that destructiveness which so specially characterises it.*

He regarded as prevalent opinions among surgeons:—

1. That a cancerous tumour is the expression of a specific blood condition.
2. That a morbid material is present in the blood, and causes the growth of the tumour.
3. That the disease has its origin in the constitution at large.

Two other opinions also held by some, namely:—

4. That the disease is in its origin purely local.
5. That, though local in development, there are general or constitutional conditions favouring its occurrence.

Mr. De Morgan then proceeds to define the word constitutional; he means an all-pervading condition, which will sooner or later find its local expression in altered nutrition, new growth, &c., which will in their turn be evidences of the constitutional state. He admits that there are, to a certain extent, strong grounds for regarding cancer as something more than a local disease.

1. The all but certainty of its recurrence, remove it as we will.
2. Its hereditariness.
3. Its frequent association with other forms of irregular growth.
4. Its often rapid diffusion.
5. Its power of infecting the system.

He believes that cancer is "more frequently inherited than is generally admitted;" but he questions the evidence of there being any special disease in

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* This abstract refers chiefly to the *opinions* of the various speakers.

the blood, which either alone produce cancer, or which co-operate with tissue specially fitted for the development of the disease. The view which he would maintain is that although local in its origin, there is in some, possibly in all cases, a predisposition to the disease, which may possibly be distributed through the system, but which more probably has its seat in some one of the tissues of the body.

Against the theory of the blood being a cancer-poison holding fluid, Mr. De Morgan argues that in the early history of the majority of cases of cancer, the subject thereof has enjoyed excellent health. He says further: "Growing cancer is removed, and the disease may never return, the patient remaining in perfectly good health. What are we to assume here if we adopt the doctrine of blood disease?" "There is nothing," he says, "that seems to contra-indicate the presence of blood poison in cancer more than the well-known fact that the disease, after operation, rarely returns in any of the ordinary seats of election." Another argument against the existence of blood poison he finds in the circumstance, "that wounds will heal and repair in a patient suffering from cancer as though the blood were in the purest condition." Mr. De Morgan says each tissue—each active element of that tissue—has its own vital property; and that the blood, a common fluid, is distributed to all alike, each taking and appropriating what it wants. Of course, he says, it will be evident that impairment of the nutrient fluid will cause an unhealthy state of the tissue to be nourished; but is it not also the case that if the tissue be impaired the purest blood will fail to induce healthy nutrition? He says, after giving certain illustrations on this proposition, "let us pass to a simple tumour, a fatty tumour, or a wart; here in the one case we have a common blood circulating through all the fat in the body; but in one part there forms a separate growth due surely to some nutritive or formative change in the parts; so in warts, the increased development of the *rete mucosum* must be due to the part and not to the blood. If the part is capable of initiating those changes which lead to tumour formation, why assume that in tumours which show more characters of tissue change, there must be some additional agency outside the tissue in operation? Admit that the element of any tissue may take an independent action, and no line can be drawn between the mode of origin of the simplest and and most malignant of tumours." Mr. De Morgan selects enchondroma in illustration. It is certainly impossible to say why one enchondroma should remain as pure cartilage, and another go on to softening and dissemination. No one would consider necessary a special quality of the blood to account for the varying characters of adenomas of the breast; that such are explainable by a disposition to perverse development in an atom of the natural tissue. He thinks that there is nothing in cancer which is not contained in other forms of infecting tumours—the mere structural peculiarities will explain the differences in the degree of

malignancy found in the various forms of cancer and other tumours; that cancer gives no notice of its advent by any symptoms of constitutional disorder; that the diffusion of cancer when once formed can be accounted for without supposing any concurrent disease of the blood, and he believes that cancer and other tumours may remain in a rudimentary state for an undefined length of time. In the case of recurrent cancer, we often see that an enlarged and hard gland, which has been left after the removal of the main tumour, will remain quiescent for years, and that then active growth will set in." He admits that it is not improbable that the advancing degeneration of age often plays its part in cancer development. Scales,or warts, or moles, some imperfect epithelial growths, may remain without change for fifty years, and then may become the seat of cancerous growth. If such a scale or other imperfect tissue were persistently irritated it would doubtless become cancerous at an earlier period. Cancer has been there potentially for years, but its time has not come. Such, he believes, is the explanation of the fact: while it is possible, he says, that the germs of cancer may thus remain in a dormant condition for long periods of time, he does not deny that there is, in cancerous patients, a special disposition to tissue-change located in some, but not in all, of the structures of the body. The alleged excess in frequency of cancer in women he put forward as an argument against cancer being a blood disease.

Mr. SIMON said that, in the light of present knowledge, the cancer process cannot be said to have its exciting cause in the blood or general chemistry of the body, in the sense which was intended a quarter of a century ago by various writers, who taught that view not only in a literal sense but in a larger sense, that is to say, in a "previous general empoisonment of the blood." He believes in the influence of the total constitution on the development of cancer, at least in the sense of predisposition, on account of the hereditariness of the disease, and of the unsusceptibility of the body generally to the inoculation of cancer. He would define cancer to be not a disease of one anatomical form, nor a disease which has its criterion in any local relapsiveness, or in any original plurality, but in a disease of which the one essential character is dynamical, consisting in that specific force which is popularly known as its malignancy. It is by virtue of this quality that cancer is a disease, *sui generis*; and this quality he would venture to contend is not a matter of mobility of textural elements. The part primarily affected exercises on the tissues which receive its juices an influence, for which we can hardly use another term than impregnative or spermatic influence; that is to say, that it causes those other tissues to fructify in conformity with its own deranged pattern.

"Cancer," Mr. Simon said, "presents itself to my mind as but a part of the very large subject of chronic dyscrasies due to local infection." The cardinal point seems to Mr. Simon to be, that the cancer process, followed from first

to last, is such as to establish for cancer an evident analogy with tubercle, and, if less evidently, still certainly an analogy with syphilis.

Mr. HUTCHINSON, declaring himself an adherent of localism, said it frequently happens that cases are seen which, if treated at an early stage on the theory of local origin, might have been satisfactorily cured; but which, having been neglected, the disease has been allowed to get possession of the body, to infect the blood, and to infect the glands, and thus a malady which was curable in the early stage became in the end totally hopeless. He believes that patients who are liable to common warts in unusual numbers will generally be found to have had relatives who had suffered from cancer, and there has certainly been observed an hereditary transmission, and some proof of relationship between the various forms of innocent growths and those strictly malignant.

Sir JAMES PAGET holds that we must look at the same time for a local and for a constitutional origin of cancer; but he thinks that there are some cases in which the constitutional origin is hard to discover, such as where cancer occurs in scars of old burns which may have been fretting and ulcerating, year after year undergoing no unusual change, and then at last becoming the seats of cancer, or when cancer attacks the lip after years of perpetual irritation; "but, nevertheless," he added, "I do not see why the scar of an old burn or a perpetually irritated lip is to enjoy immunity from cancer more than any other tissue of the body." Were these the only cases to be studied cancer would seem a completely local disease, needing only the lowest degree of some constitutional element for its production; but, at the further end of the scale there are found growths unlike any others that are produced in the body, unlike anything that can be called purely and simply a local disease, thus we are bound to adopt another pathology to explain them, viz., that there is a large predominance in the history of cancer of the constitutional element. He believed that cancer is a disease of degeneracy,—the frequency of cancer increases as years increase.

He would lay stress upon the manner of inheritance, because the special inheritance of cancer distinguishes it from the common inheritance of malformation and local diseases. That in the transmission of cancer by inheritance there is no rule of limitation is seen in malformations and local diseases, and he quotes Mr. Baker's paper in the "Transactions of the Medical and Chirurgical Society," in support of this. The transmission of cancer accords with the transmission of other hereditary constitutional diseases: gout, syphilis, tuberculosis, scrofula. In a large number of cases cancer follows injury, and sometimes so quickly that it is impossible to disconnect it from the changes which injury has produced; under such circumstances, the deviation from the ordinary process of repair indicates some constitutional defect in the person in whom such occurs. The production of cancer by injury is according to the same law as is in action when the ordinary

effects of injury are deviated from in consequence of some constitutional peculiarity of the person on whom the injury has been inflicted. Sir James Paget insisted upon the constancy of recurrence after operations, or after complete excision, and in the method of its recurrence. It was not consistent to use exceptional cases in which cancer has not recurred (as far as may be known) to overthrow the doctrine of constitutional disease. As regards the method of reproduction of recurrence, which distinguishes cancerous tumours from non-cancerous—that cancers appear in distant parts, while non-cancerous tumours re-appear in the same part with few exceptions,—he thinks that this recurrence in distant and dissimilar parts establishes the essential difference between cancer and a local tumour; that while a non-cancerous tumour may recur over and over again after removal, it does so in the part in which it originated. On the other hand, he says, "you cannot find an instance of rapidly-growing, soft-textured, vascular cancer of any form which can be removed three, four, six, eight, ten or twenty times without recurrence, not in the place of growth alone but in distant organs, and I believe it is vain to attempt to explain this difference of the recurrence in distant and dissimilar parts which we find in recurrent tumours or occasionally in the more ordinary kinds upon any facts of different physical condition;" and he follows by objecting to the mobility of the cells, *i.e.*, their physical condition being sufficient to explain the difference in propagation. Recurrent fibroid growths differ little in physical condition from cancer, while they do not propagate themselves except in rare cases, and therefore the effects of the method of propagation to distant and dissimilar parts are so characteristic of cancers that we must assume an essential difference between them and other tumours.

He argued that the whole objections raised against cancer being a blood disease may be applied as objections just as well to the belief in any blood disease whatever. In relation to the predominance of cancer in the female, Sir James argues that cancer is a disease of degenerated tissue; that it is wholly erroneous to suppose that cancer is a disease of healthy persons; that its frequency increases, as before stated, as age goes on; that two organs in women at a comparatively early period in life enter into degeneracy—the breast and the uterus; and that it is the predominance of cancer in the breast and uterus that alone accounts for the greater frequency of cancer in the female than in the male.

Mr. ARNOTT attributed great importance to the mobility of the elements of a tumour; that the mobility of the elements of a tumour stand in direct ratio to its malignancy, and adduced the fact that glioma of infants is, of all tumours, one of the most malignant; while in simple tumours, fatty tumours, fibroid tumours, and the like, there is nothing in the mobility of the cell which would tend to their reproduction in other parts, or their diffusion throughout the body. He also says that from a part which is, from its position, warm and moist, such as the frænum

of the tongue, or the os uteri, and has free vascular and lymphatic connections, and occasional great functional activity, we have speedily an affection of the lymphatic glands in the neighbourhood, and possibly deposits of cancer in distant parts of the body; and he could see no necessity for any hypothesis of a blood disease, if we admit the constitutional peculiarity which underlies the simplest tumours, and take into consideration the anatomical difference and the position between malignant and innocent growths.

Sir WILLIAM GULL, assuming that which Sir James Paget contends for, the constitutional origin of cancer from its hereditary tendency, refers to some condition of the ovum or of the spermatic fluid, and as there is no blood in the ovum or the spermatic fluid, maintains that the cancer element cannot therefore reside in the blood. He asks constitutional theorists to explain the immunity of certain portions of the intestinal tract. He concedes the possibility of constitutional predisposition, but as soon as the ovum has differentiated into tissues, then, he says, that what is called a constitutional condition becomes a local one, and he says, as regards blood disease, to use the term is to lose oneself in conjecture, for he sees no proof whatever that gout is a blood disease, or that typhoid fever, even, is a blood disease. He quotes the latency of hydrophobia, a latency which he asserts may remain thirteen years, and contends that the poison lay latent in the tissue until change came over the poisoned tissue and infected the system. He thinks malignant disease may be regarded as a local condition of the affected tissues, however much the local development of it may have had to do with some inherited predisposition, which may appropriately be termed constitutional.

Dr. SQUIRE argued that a characteristic of the general disease is that it affects particular organs and tissues.

Dr. PAYNE would define the meaning of the word "constitutional"—a lesion or change in which the general disposition of the body has a very large share, and the influence of external cause, injury, irritation, and so on, has a comparatively small share; but between these causes there are infinite gradations. He thinks that the term constitutional has sometimes been used to denote, on the one hand, something innate, and, on the other, something general, and that arguments in favour of cancer being constitutional have assumed more force than they otherwise would possess in consequence of this confusion of terms. He assumed that cancer is a growth which, whatever its minute character might be, had already begun to infect or infiltrate a neighbouring part. Infection or infiltration is really a change of growth or process, which having begun in one tissue has passed over from that into another which is adjacent, and not of the same kind—that some quality or mode of growth which originally belonged to one tissue has passed over to another. He thinks that infective tendency, or constitutional tendency, is in reality a point of structure, and that syphilitic

and tubercular disease are both constitutional and local, and that precisely the same may be said of cancer—that whatever may be the material that stirs up the new growth, it is transmitted through the body in attachment to cells; and Dr. Payne infers that the prevalence of cancer in the uterus and mammæ is in favour of the predisposing cause of cancer being a condition and property of tissue and not a property of the body as a whole, or the property of the blood, since it is certainly the tissue that is prematurely old and not the blood.

Dr. MOXON said that if one takes the view that the general system is first charged with cancer, and that all the cancers that appear are but outputs of these general cancers, why should we operate at all? The distinction between this view and that of cancer being purely local is one that cannot be bridged over. Constitutionalism is really the putting out in different localities things which were unfolded in the germ, so that really to become local is the very essence of being constitutional. He believed that cancer appears first in a certain locality, and that the danger of cancer consists in the extension from that locality; that cancer becomes general and fatal through the influence of a part first cancerous. That cancer spreads in a part, that it runs along the lymphatics, makes its way along the blood-vessels, through the medium of the circulation, to regions remote, are facts, and therefore there is no room for any theory of general carcinosis. He supported the theory of local origin, by instancing the repetition of the actual tissue in which the cancer first grew, in the secondary formation, that cancer of the colon in some cases is a structure resembling that of a portion of a constituent of the mucous membrane of the gut, and that this element of the mucous membrane of the gut is repeated in the secondary deposits in the liver; and he instanced further the case of bony tumour in the lung secondary to bony tumour of the shoulder, and while questioning the alleged frequency of cancer being hereditary, and availing himself of the acknowledged hereditariness of non-malignant tumours, he would say, that what applies equally to the non-malignant and to the malignant can in no way explain the peculiarity of the malignant. He considered cancer, syphilis, and tubercle as disorders which become generalized from a local origin and very rapidly become so generalized.

Mr. ERICHSEN laid stress, while ranging himself as a localist, upon "the extreme vascularity, not of the cancerous tissue itself, but of the tissue which surrounds the cancerous tumour," and he looked upon one of the results of this, to be the very rapid washing of the cancerous elements into the general circulation, and thus is explained carcinosis or cachexia almost as soon as the local disease is recognised. He thinks that the absence of an enveloping capsule in cancerous growths tends to favour the general constitutional infection, and thus to confuse somewhat the idea of the constitutional and local origin of the affection. He pointed out that if hereditariness were

established in one case in three, it still left two-thirds of the cases to be otherwise accounted for, and he thinks that we ought not to attach too much importance to hereditariness as evidence of the constitutional nature of cancer; but while asserting that cancer is local, he believes there are certain constitutions that afford a far more fertile soil for the development of that local poison, in which it grows and spreads, and through which it developes itself with a degree of vigour not seen in other constitutions. Mr. Erichsen referred to the facts of the geographical distribution of cancer as demonstrated by Haviland as involving points not yet worked out.

Dr. CRISP thinks that the geographical prevalence of cancer may be accounted for by the constant marrying within a circle of the inhabitants of country places. He disputed the correctness of Mr. De Morgan's estimate, that 90 per cent. of the cases of cancer occurred in the uterus and breast. He quoted (in round numbers) from the Registrar-General's returns to the effect that out of 60,000 cases of cancer, 18,000 were males and 42,000 females.

Mr. HOWARD MARSH said that although there is no blood in the ovum, in the same sense there are no limbs, but just as the limbs are present prospectively in the ovum so is the blood; therefore, if there is a tendency in the ovum to the formation of cancer, why should it not pass into the blood just as it might into the limbs?

Dr. GREENHOW did not think we could maintain either the exclusively local or the exclusively general origin of cancer. It is impossible to study cancer without seeing that there is something more than local condition, and that although cancer may begin in the locality, there is something in the system beforehand which is called predisposition or hereditary tendency, and he thought that the hereditary tendency to a cancerous disposition is not the same as that hereditariness which leads to the development of a particular congenital deformity; neither has it a tendency like that of gout, which manifests itself sometimes in one locality and sometimes in another in the same individual, and even in different forms of local disease. He believed that cancer most nearly resembles tubercle in its hereditariness, and he referred to the recurrence of cancer after long intervals of latency, in situations at a distance from the original site, where it is difficult to assign re-appearance of the disease to the transference of germs from the place of origin to the new seat.

Dr. CREIGHTON had examined secondary tumours, especially in the liver, both cancerous and sarcomatous. He found that the point of departure for the liver tumour was the liver cell itself, and that not in the way of proliferation or multiplication of nuclei, but in the way of endogenous formation by vacuolation of the protaplasm of the liver cell, and the differentiation of the solid product that survived the vacuolation; and he arrived at the conclusion that from liver cells there might develop not only various kinds of epithelial cells, but also connective tissue

cells, including spindle cells, giant cells, and the cells of myxomatous tissue, according to the nature of the primary tumour. In all the cases the secondary tumour had a remarkable resemblance to the primary tumour. It appeared, then, that the relations between primary and secondary tumours are comparable to no other relation in nature than that of parent and offspring. The histological process, vacuolation, constitutes an argument in support of the hypothesis that the influence of the primary tumour in the formation of the secondary tumour is analagous to a spermatic influence; the spermatic influence, however, does not account for the formation of the primary tumour, but he suspects that in the mammary gland at least, the process of involution and evolution will account, not perhaps entirely, for the existence of the tumour, but for the particular combination of connective tissue and epithelial tissue which so puzzles histologists in investigating such growths. He believes that whatever is constitutional in cancer is developed from the primary tumour after it has attained a certain maturity, and that the multifarious vicissitudes of cellular life, which may be the point of departure of cellular growth, render it superfluous to refer the cause of cancer to constitutional elements.

Mr. RIVINGTON believed that there were some secondary cancerous tumours which were secondary only in point of time, and not in point of relation to the primary tumour; he saw nothing peculiar in the structure of cancer; the cells were either conceivable or actual modifications of the cells of the part, epithelial, connective-tissue corpuscles, or white blood cells, or of all three of these together; there was nothing peculiar in the stroma; but the localist theory does not afford explanation as to how the disorderly crowding abnormal growth of natural elements occurs. The real question is, what is it that causes the cells to grow and develop abnormally? Even supposing that all cases of cancer could be referred to some source of local irritation, we should be one step nearer the explanation, since we know that the ordinary effect of local irritation is not the production of cancer. He thought that if it is necessary to assume the presence of some morbid material as a cause of cancer, it is safer and near to the knowable to locate it in the tissues than in the blood! that it is inconceivable that any morbid material could float about in the blood for an indefinite time without giving rise to a manifestation of some kind; that it should remain in the blood waiting for an appropriate nidus. He considers the analogy of all morbid conditions of the blood is against such an hypothesis. In respect of heredity, if he were to concede that two out of three cases of cancer were hereditary it would still leave the third case unaccounted for. That while not putting it forward as a fully developed hypothesis he suggested that the lymphatic system, which includes all the connective tissues and all the serous and synovial membranes in the body and all the insterstices of the organs, may be primarily at fault. Mr. Rivington

illustrated this position by referring the constant appearance of cancer in the connective tissue, the frequent origin of cancer in lymphatic glands, and the frequent *recurrence* of cancer in lymphatic glands, to the immense stress of work laid upon the lymphatic system and parts where there is great activity and constant tissue-change, &c.

Dr. BROADBENT agreed with Dr. Payne, who said that constitutional diseases are those in which internal causes are recognisable as distinguished from external causes. If we examine cancer by this light we find every phase of constitutional condition. He does not think that cancer has its origin in a general carcinosis, but thinks cachexia results from the effects of local manifestations. In some cases the constitutional condition is everything, in some the local condition is everything, and he referred to the facts connected with chimney-sweeps' cancer.

Sir WILLIAM JENNER regarded the blood, not as an indifferent fluid, but one of the highest importance, illustrated by the behaviour of blood in coagulation in small-pox, erysipelas, and malignant typhus. When he spoke of cancer being a constitutional disease, he meant that it is an outgrowth or local development, possibly in every structure of the body, in every part of the system, a tendency to which is conveyed by the parent. He believed cancer to be hereditary; that no one could dispute for a minute the three propositions that cancer spreads at the spot, that cancer affects the lymphatic glands next the primary seat of cancer, and that cancer often spreads along the course of the veins; that one does not cease to be a constitutionalist in consequence of this admission; and that cancer would not develop from an injury unless there were a disposition under irritation to frame cancer. Secondary growths may be developed from a something taken up, not necessarily a germ, in consequence of the constitution having this peculiarity.

Mr. De MORGAN, in reply, stated the whole gist of his argument was to show that whatever may be the extent to which some constitutional condition influences the production of cancer, to the same extent we may conclude that the constitution influences or determines the most innocent tumours. Herein is found the wide divergence of opinions which exists between the constitutionalists and the localists. His explanation of the numerous well-known phenomena, alluded to by various speakers, is that there is from the first a certain part or tissue of the body which has the same tendency to abnormal growth at its due season as a hair has to turn grey or a tooth to decay—a season fixed at the earliest period of life and very often inherited from the parent. This period may be hastened by undue irritation; it may be delayed by circumstances tending to preserve the tissue in a healthy state. There is no necessity to look to the blood or to any general condition to account for this. In syphilis how common it is to find that the offspring is ill-developed or abortive, even when

there is no sign of the disease in the parent; and he dwelt upon the fact that while cancer is active and growing there is no interference with the bodily functions or with the repair of injury; that the constancy of recurrence after removal of breast-cancer was due to the mobility of the structure of the cancer and to the lateness of its discovery. So-called constitutional diseases, such as syphilis and scrofula, after years of activity, seem commonly to wear themselves out. This is an extremely rare event even in primary cancer, and almost unknown when the disease has become extended to distant parts. He sees no analogy between new growth and the products of true general or blood disease in respect of their genesis and destination. From the first the tumour is a living self-dependent formation, capable of continual growth by virtue of its own power of using the nutritive matter supplied to it; nothing like this is seen in any of the blood diseases. The nearest approach is in tubercle; but that must be regarded as a secondary product, and there is no reason for thinking that tubercle once formed is capable of independent growth.

Cancer and other growths may be regarded as the results of a new direction of organizing force, while the blood diseases, or constitutional diseases, all tend to impairment or derangement of the organs already formed, or, at most, to the effusion of unorganized products. The conclusion pointed to by the arguments adduced was, that the same constitutional element which gives use to any local peculiarity, may be active in the production of cancer, or that perhaps the same force which determines the original growth of muscle or bone or nerve out of what appears to be a homogeneous mass of matter, may be the determining force in the production of cancer.

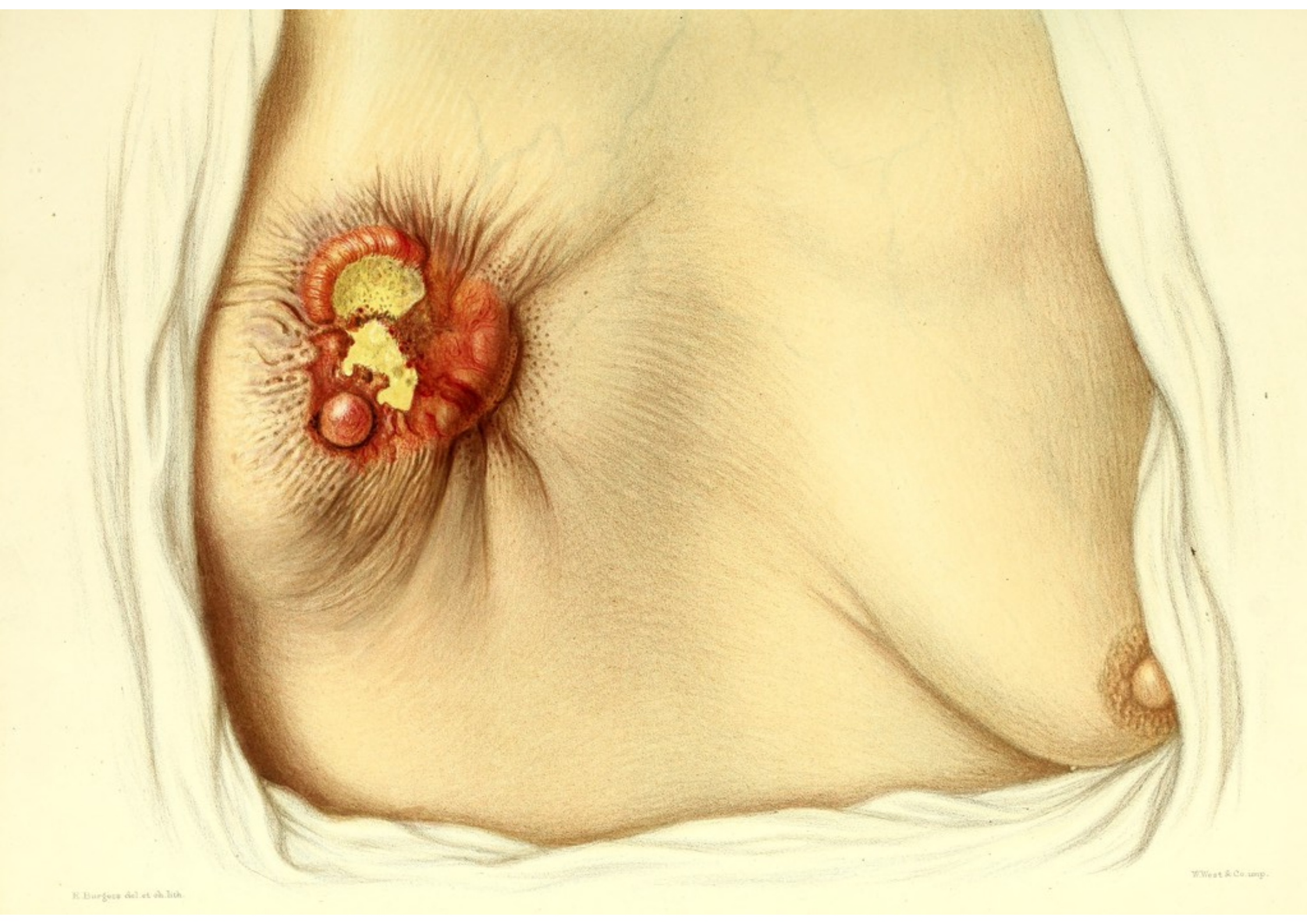
PLATES.

PLATE I.

SCIRRHUS OF THE RIGHT BREAST, showing a foul, deep ulcer, consequent upon necrosis and sloughing of the primary scirrhus mass. It is surrounded by a protuberant collar of recent deposit, the actual edge being everted. The protuberant portion was covered by a fine skin, through which thin-coated vessels were visible. The activity of deposit is greatest at the upper part, and here it is rounded and more tense; at the lower edge atrophic change has taken place with some excavation. The orifices of the sweat ducts are depressed and the skin is puckered, and there are close at the edge nodules that look like œdematous and hypertrophied papillæ. The wall surface of the excavation shows abundant vascularity, while the floor of the sore is grey and gangrenous.

PLATE II.

CHRONIC CANCER OF THE RIGHT BREAST, the left breast being unaffected. The nipple of the right side is at a much higher level than that of the left side, the whole of the tissues having undergone atrophy. The orifices of the sweat ducts are more depressed than shown in Plate I., and there is greater puckering. There has been some superficial ulceration, but no gangrene. Towards the sternal border the nodules of cancer are scarlet and undergoing atrophic changes; above the nipple the ulcerated surface is surrounded by active cancerous deposit. The superficial subcutaneous veins are remarkably prominent.

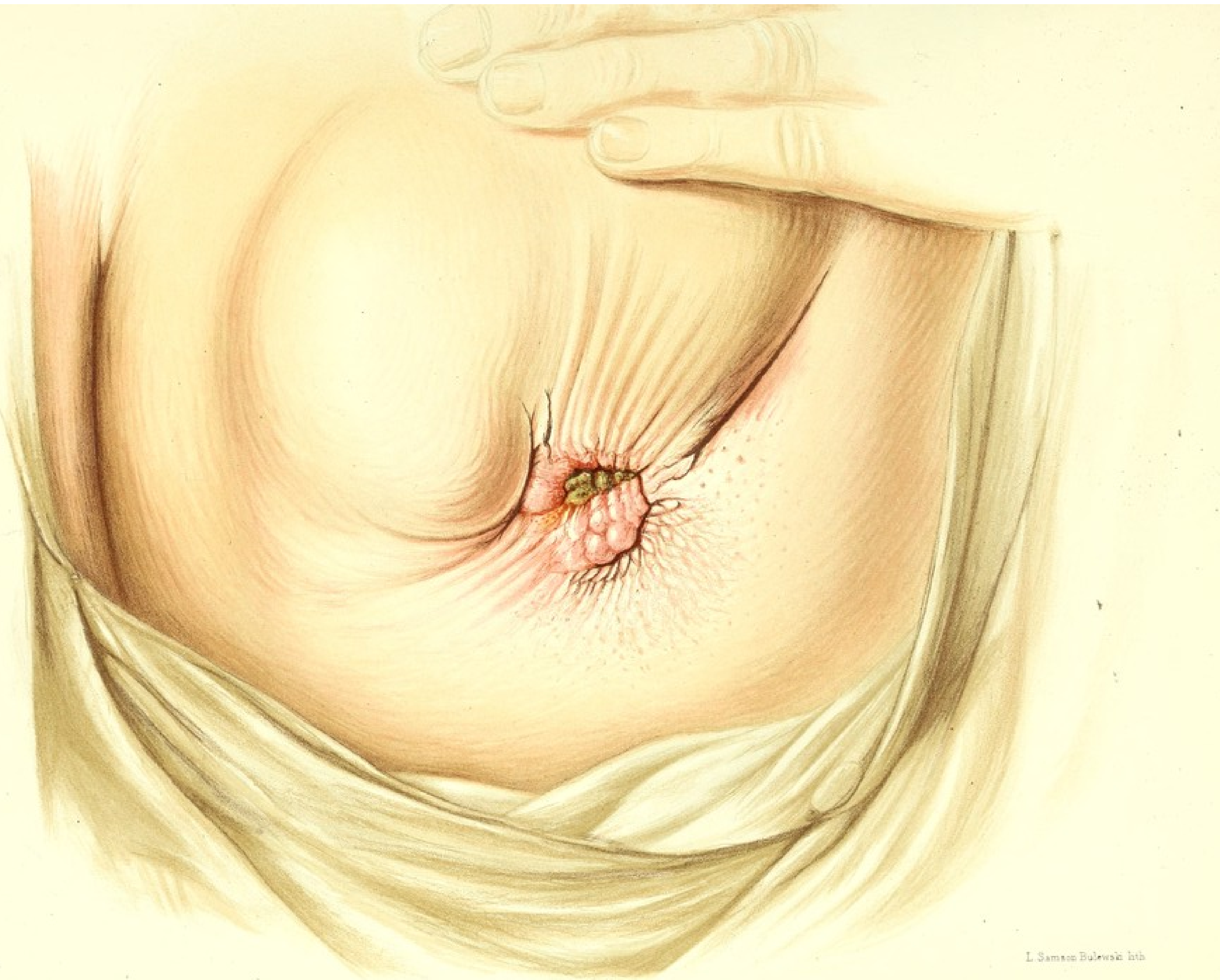


F. Burgess del et ch. lith.

W.West & Co. imp.

PLATE III.

CHRONIC CANCER OF THE RIGHT BREAST. The atrophic process has not been attended by active outgrowths; the orifices of the sweat glands are less depressed than shown in Plate II. The nipple is almost buried by overhanging fatty tissue on the axillary side, and drawn inwards on the sternal side by the contraction of the shrinking tissues; a small indolent ulcer is seen to the sternal side of the nipple.



Edwin Burgess del.

L. Samson Bulewski lith.

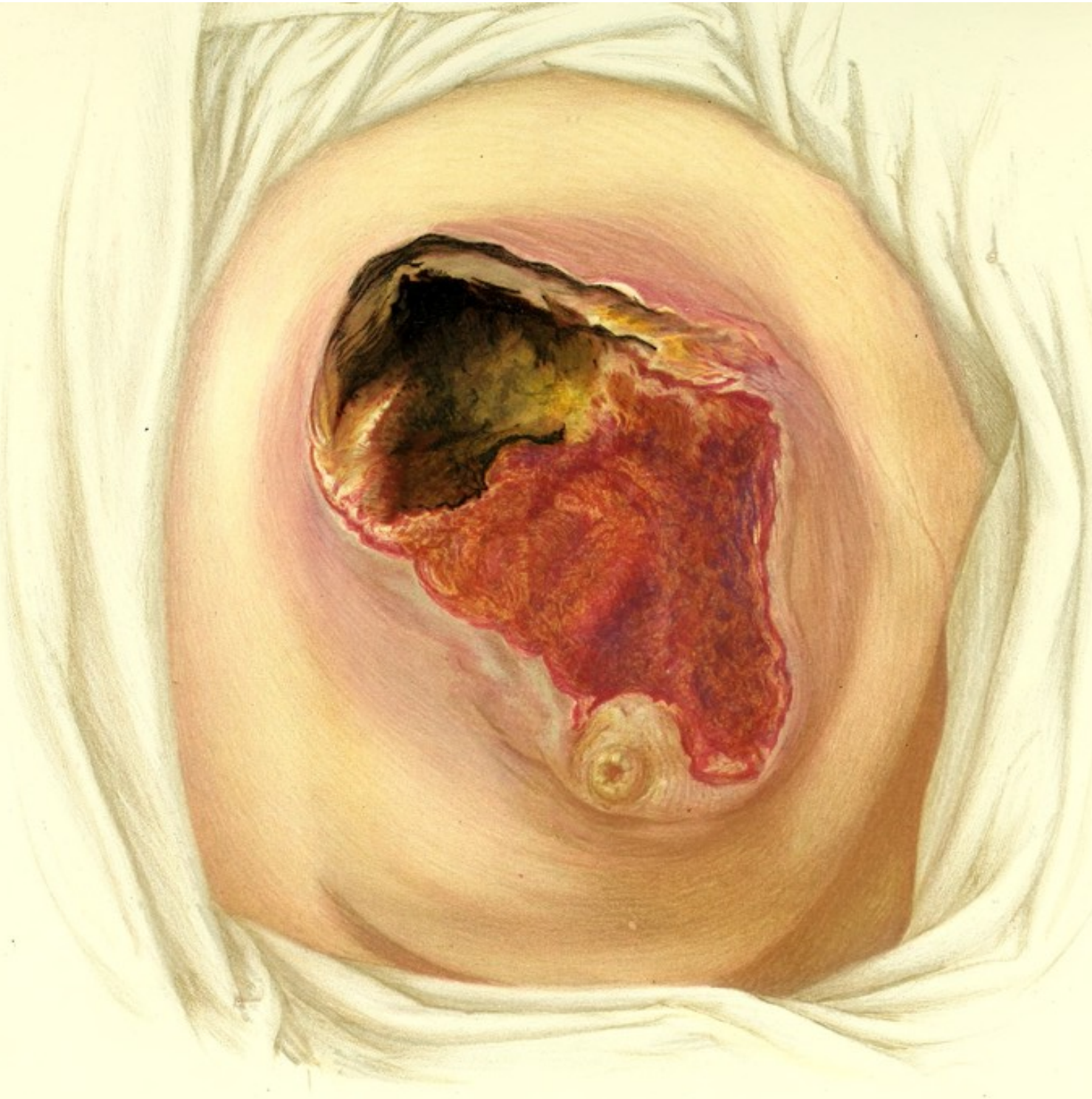
PLATE IV.

CHRONIC CANCER OF THE RIGHT BREAST. The whole of the tissues of the pectoral region have undergone contraction. There is towards the sternal border a more definite deposit producing an elevated margin; the whole surface is marked by scarlet vessels, and the deposit is in the form of tubercles which appear to have a tendency to waste from the centre. Scattered tubercles are seen beyond the limit of the breast in the skin of the axilla, which also have evinced the disposition to central atrophy.

Edwin Burgess del. M&N Hanhart imp. L. Samson Bulewski lith.

PLATE V.

CANCEROUS SORE OF THE RIGHT BREAST, where healthy cicatrization is going on at the lower margin, while gangrene has seized the upper and axillary portion of the sore. There is no retraction of the nipple, no dimpling of the orifices of the sweat ducts. The cicatrizing region presents the characters of an ordinary healthy sore; the sphacelated region is occupied by a brownish black mass of dead cancer, surrounded by a border of skin that is gangrenous.



M&N Hanhart imp.

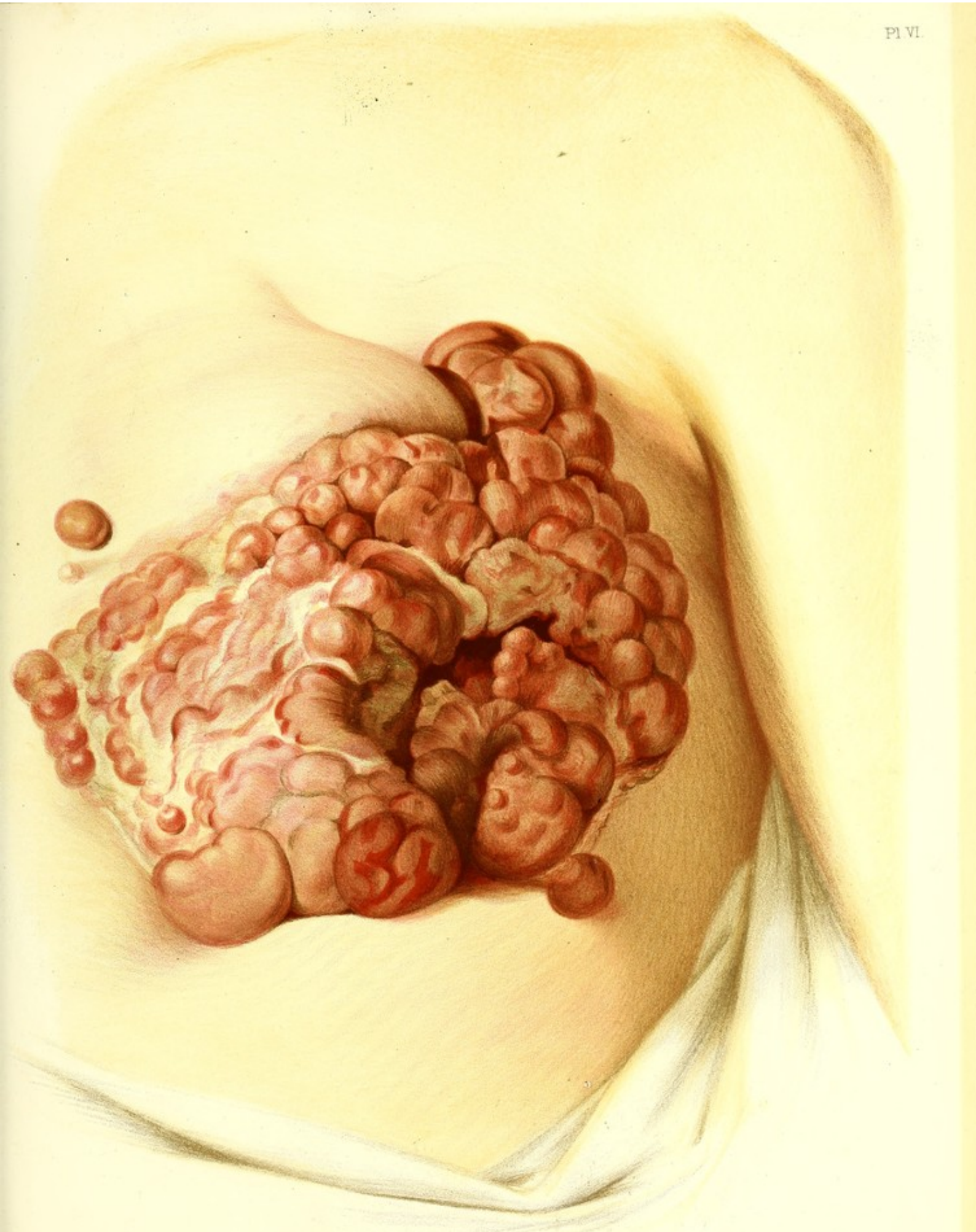
L. Sansom Bulewski lith.

PLATE VI.

CANCER OF THE LEFT BREAST.—The region of the left mamma is occupied by a mass of spheroid semi-transparent nodules; the nodules were covered by a fine cuticular layer with no marked disposition to gangrene or central atrophy. Microscopical sections of the growths are illustrated in Plate XVII., figs. 3 and 4.

The patient was under observation during fifteen years.

The upmost limit of the drawing shows the shoulder of the patient: below, the axillary fold. The inner and upper part of the drawing towards the sternal side shows a bulging remnant of the fatty tissue of the breast. A little lower is an isolated, almost pedunculated tubercle; a series of four similar tubercles bounds the innermost extent (apparent) of the disease.



J.Goodall del.

M&N Hanhart imp.

L. Samson Bulewski lith

PLATE VII.

Fig. 1.—Section of popliteal lymphatic gland. From a case of tumour of fibula: glands in the popliteal space, as well as in the pelvis, enlarged by similar growth. The patient died from secondary deposit in the thorax. The cells have assumed no definite arrangement, and are more or less uniform in size.

Fig. 2.—Section of axillary lymphatic gland in a case of cancer of the breast. The larger cells are clustered in alveoli, and are surrounded by "lymphoid" cells.

Fig. 3.—Section of axillary lymphatic gland in a case of lymphadenoma. The cells are of uniform size, not arranged in alveoli. The patient was operated on by Mr. P. Harper, a large mass of glands having been removed from the axilla.

Fig. 4.—Section from an isolated nodule in the neighbourhood of the cicatrix after removal of the breast, years previous to removal of the nodule. The large cells are arranged in alveoli, and are surrounded, as in fig. 2, by lymphoid cells.

Fig. 1.

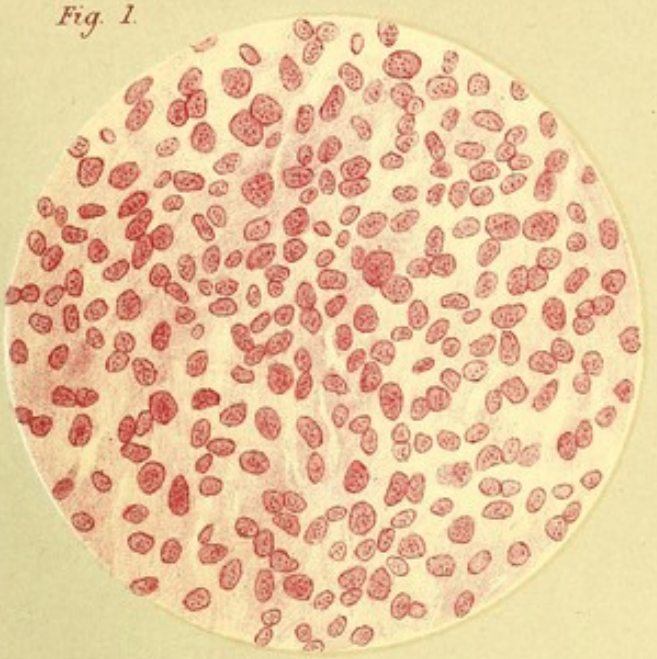


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Fig. 2.

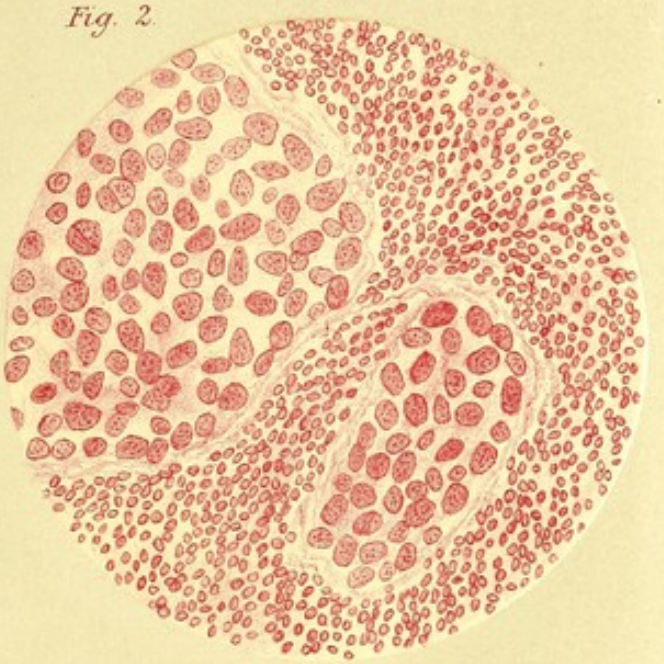

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Fig. 3.

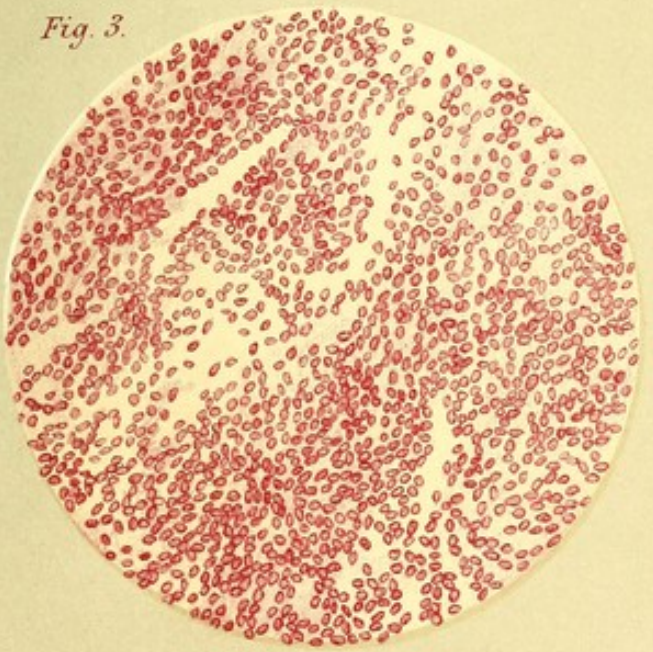

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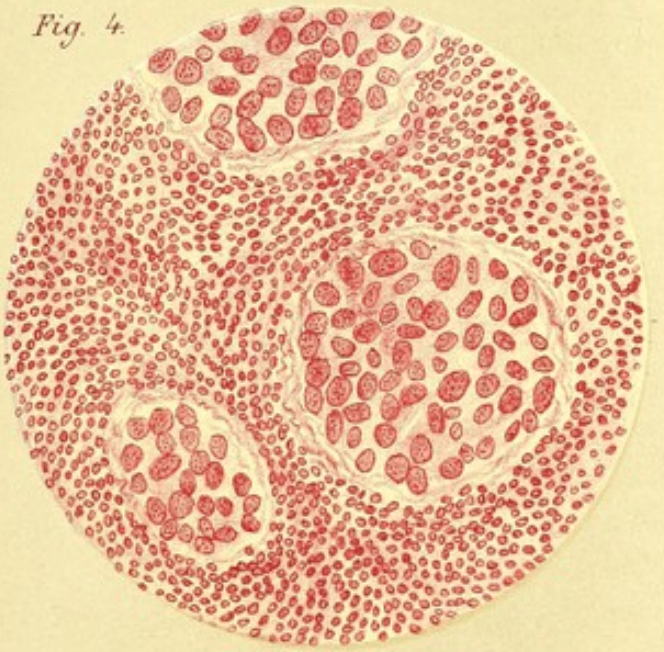
Fig. 4.



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C. Berjeau, del et lith.

Waterston & Sons, Edin^{r} imp.

PLATE VIII.

Fig. 1.—Section of mammary tumour (adenoma). The nuclei of the fibrous tissue are rather prominent, and there appears to be irregular dilatation of the ducts leading from the lobules of glandular tissue. The fibrous element is hypertrophied.

Fig. 2.—Section of normal mammary gland, showing a lobule and its duct, and exhibiting the abundance of the fibrous tissue which enters into the structure of the healthy mammary gland.

Fig. 3.—Section of cancer of the breast where the small cell-element is in excess.

Fig. 4.—Section of cancer of the breast where the large cell-element is in excess, the arrangement being indistinctly alveolar from the paucity of fibrillar tissue.

Fig. 1.

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Fig. 2.

1000 in.

Fig. 3.

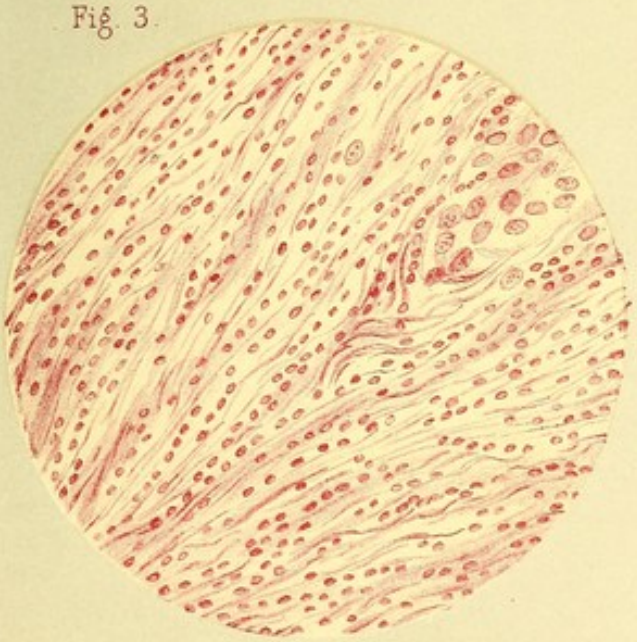

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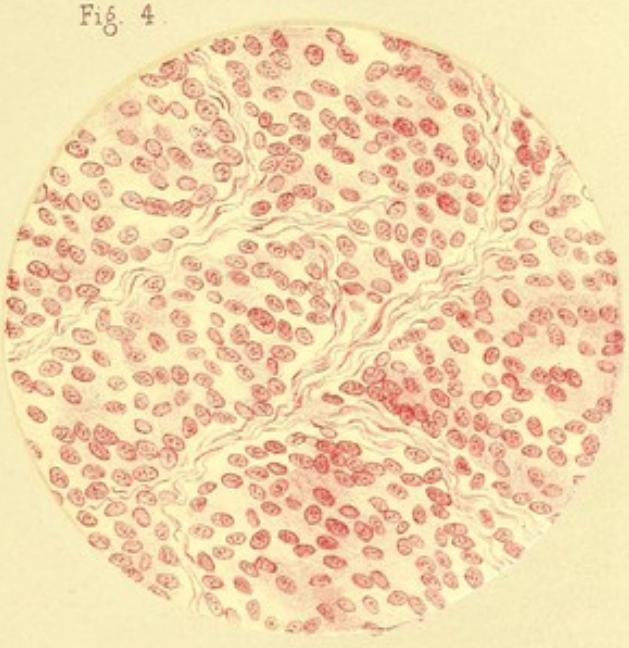
Fig. 4.



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C. Berjeau, del. et lith.

Waterston & Sons, Edin.r imp.

PLATE IX.

Fig. 1.—Section of mammary tumour, adenoma, showing the active proliferation of the nuclei of the fibrous element and of the epithelium lining the ducts.

Fig. 2.—A peculiar appearance presented by section from an outlying nodule in a case of adenoma of the breast, as though the epithelial layer had been washed away from dilated spaces and acini, separated and surrounded by hypertrophied fibrous tissue.

Fig. 3.—Section of mammary tumour, very much the same as fig. 1.

Fig. 1.

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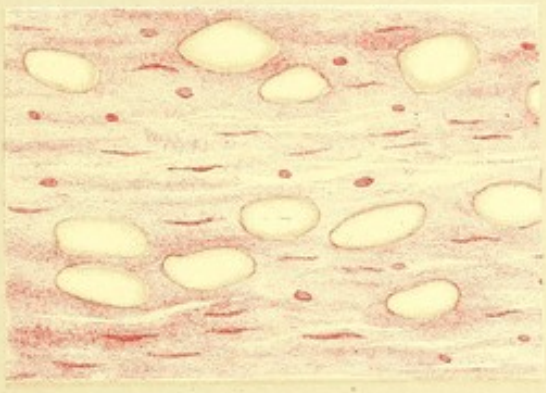
Fig. 2.



1000 in.

Fig. 3.

1000 in.

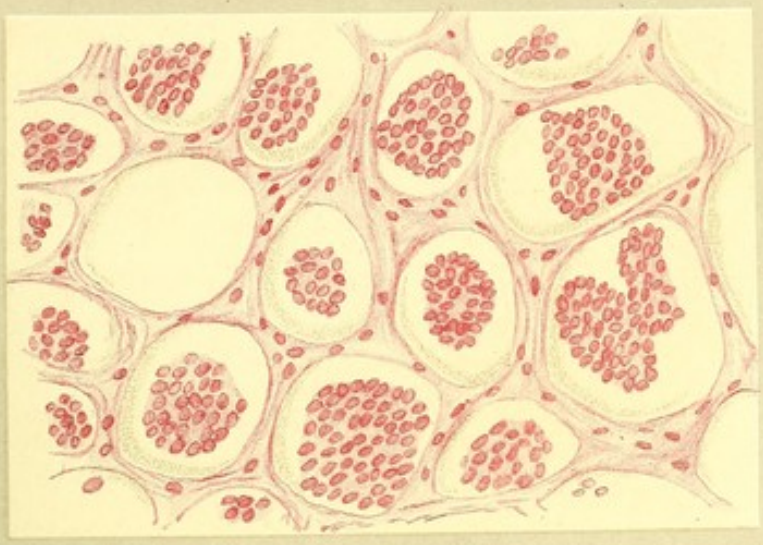
PLATE X.

Figs. 1, 2, 3.—Sections from different portions of a breast affected with cancer; the region of the breast from which each section was made is indicated by letters, A, B, C. At A the cancerous alveolar arrangement obtains; at B a cystiform change is taking place, with gelatinous distention of alveoli; at C, to the naked eye the cut surface of the gland appeared normal, but the microscopic section showed the fibrous element to be undergoing invasion by the special cancer growth.

In this case, before operation, the upper border of the mammary gland at B to the touch was cystic, the lower border at A hard, and the central portion unaltered.

The fibrous element of the upper portion of the section at C is similar to that in figs. 1 and 2, Plate VIII.

Fig 1.



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B

Fig. 2.

C

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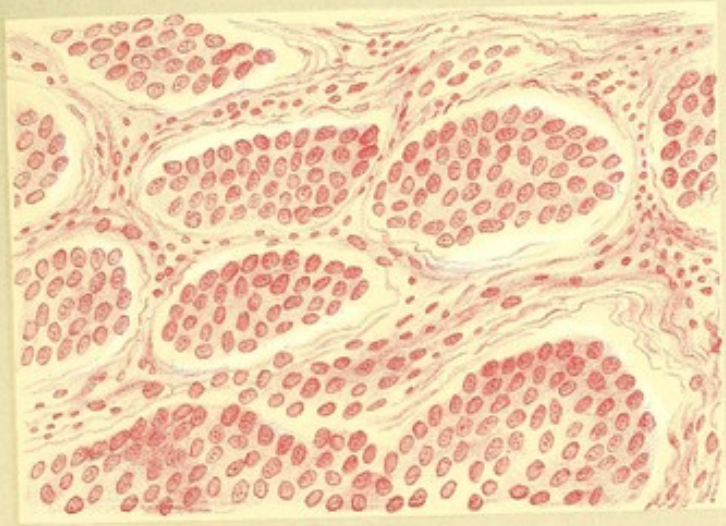
A

Fig. 3.



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C. Berjeau, del. et lith.

Waterston & Sons, Edinr imp.

PLATE XI.

Fig. 1.—Section through the skin of a patient with diffused secondary cancer; *vide* case, Crawford, p. 64.

The skin had assumed the brawny condition. The sebaceous and hair follicles are invaded by lymphoid cells.

Fig. 2.—Follicle viewed under higher power.

Fig. 3.—Section of the mammary gland of the opposite side from which the breast was removed; in the same case the acini, the periacinous tissue, and the fat tissue, are saturated with lymphoid cells, or cells not grouped in alveoli.

1000 in.

Fig. 1.

1000 in.

Fig. 2.

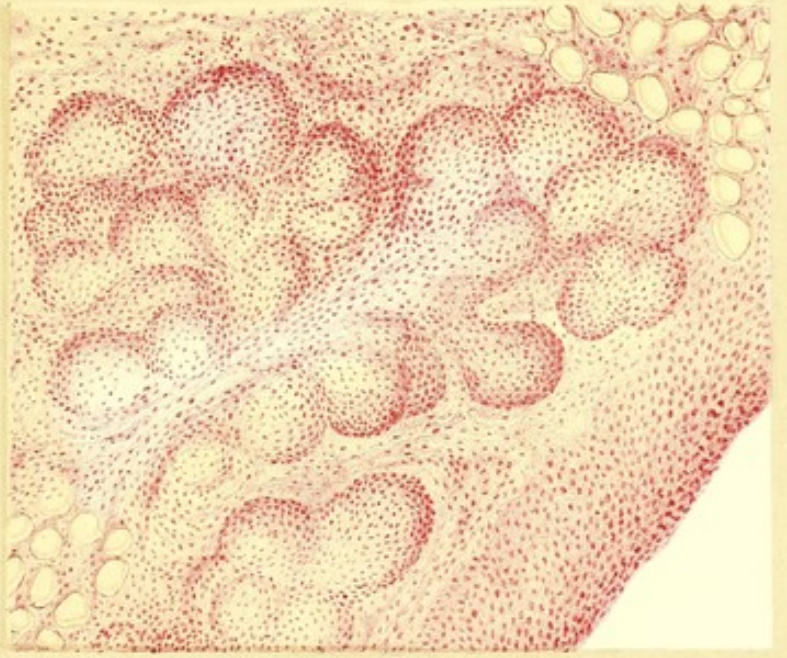

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Fig. 3.

C. Berjeau, del. et lith. Waterston & Sons, Edin^r imp.

PLATE XII.

Fig. 1.—Section of shrunken breast affected with atrophic cancer (viewed by low power). On the left of the drawing is the cutaneous surface; towards the right are seen lobules of fat tissue; the lymphoid cells pervade the entire structure, but are more especially crowded around and isolate the fat lobules.

Fig. 2.—Section of cancer of the breast, removed by Mr. Lawson, the large cells occupying alveolar spaces, and the matrix is loaded with lymphoid cells.

Fig. 3.—Section of a cancerous tumour removed with the entire mammary gland, by Mr. Morris. It presents appearances much like those of fig. 2, but there is manifested a tendency to a cystic formation. There is especial interest in this specimen, due to the circumstance that the tumour was as little fixed as a common adenoma; the breast was large, from abundance of adipose tissue, the age of the patient alone forbidding the hope that cancer was not the cause of the induration.

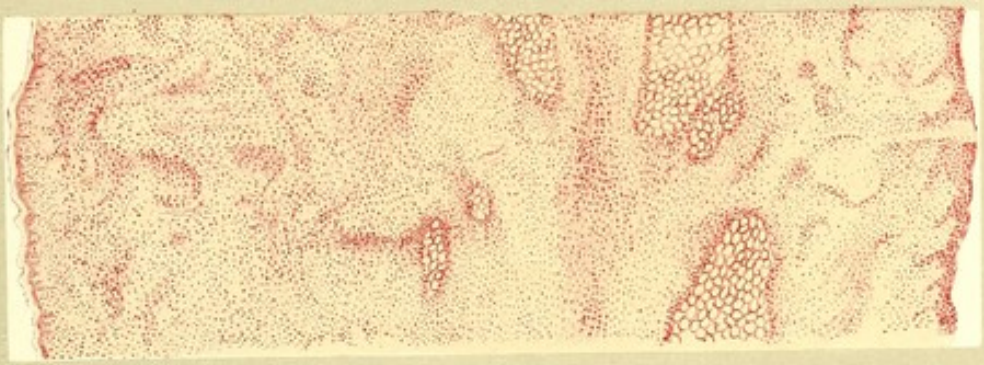

Fig 1

100 in.

1000 in.

Fig. 2.

1000 in.

Fig. 3.

C. Berjeau, del. et lith.

Waterston & Sons, Edinr imp

PLATE XIII.

Fig. 1.—Section of cancer of the breast. The large cells are arranged in alveoli, as is ordinarily the case. See Plate VII., figs. 2 and 4.

Fig. 2.—Section of axillary lymphatic gland, from same case (viewed with low power). The larger cells have not assumed the grouping in alveoli; they have externally a thick layer of lymphoid cells, bounded by fibrous envelope of the gland.

Fig. 1.

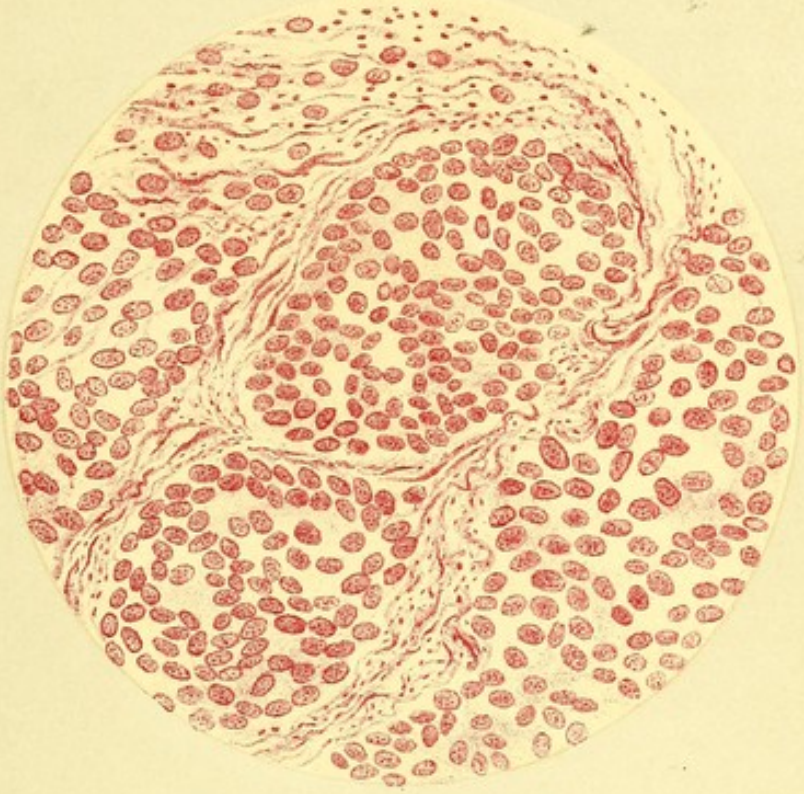

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Fig. 2.

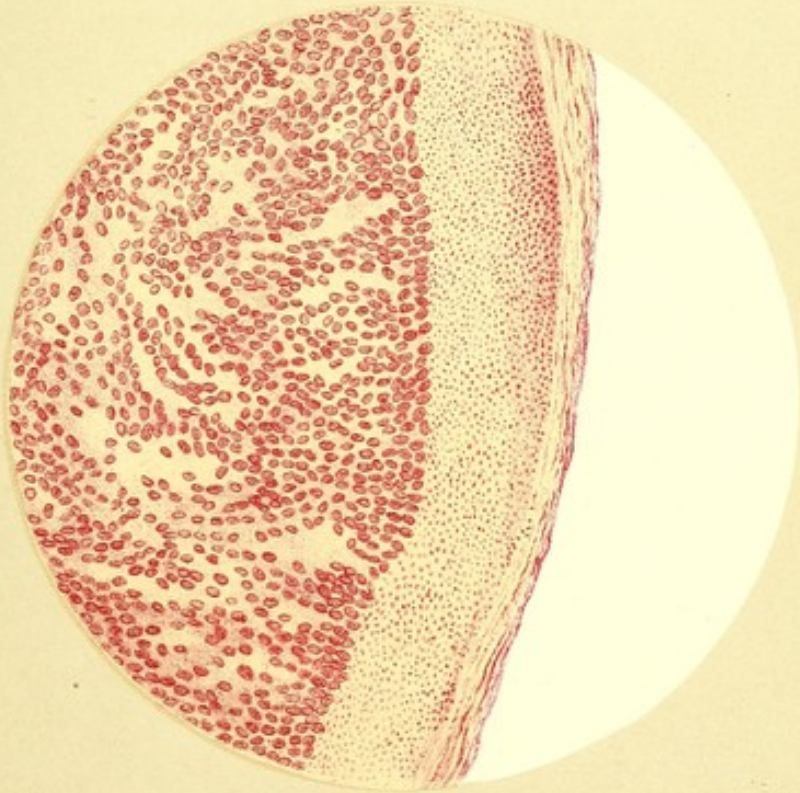

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PLATE XIV.

Fig. 1.—Section of cancer of the breast viewed by low power.

Fig. 2.—The same viewed by high power. The large cells are not arranged in groups within alveoli, but have less regular arrangement, and are somewhat intermixed with the lymphoid cells, and give a lining to spaces, on the nature of which we can only speculate. *Vide* Sir James Paget's description of the diversity in alveolar grouping, quoted at p. 149, from Creighton on "The Infection of Connective Tissue in Scirrhus Cancers." This section presents an almost exact illustration of the description given by Sir James Paget.

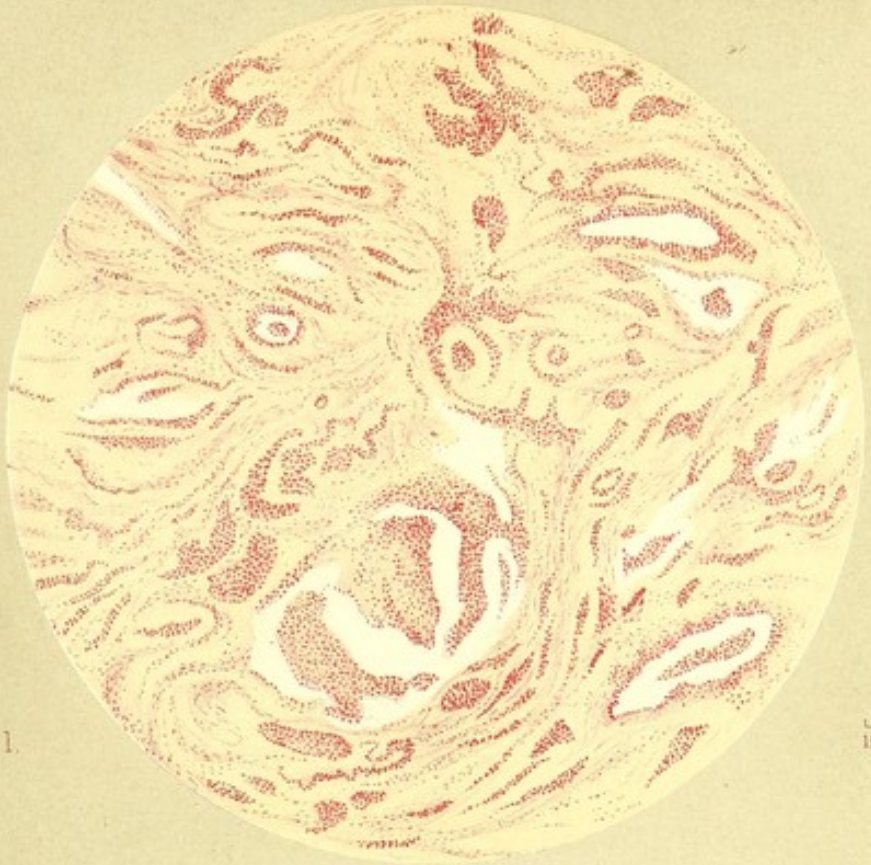

Fig. 1.

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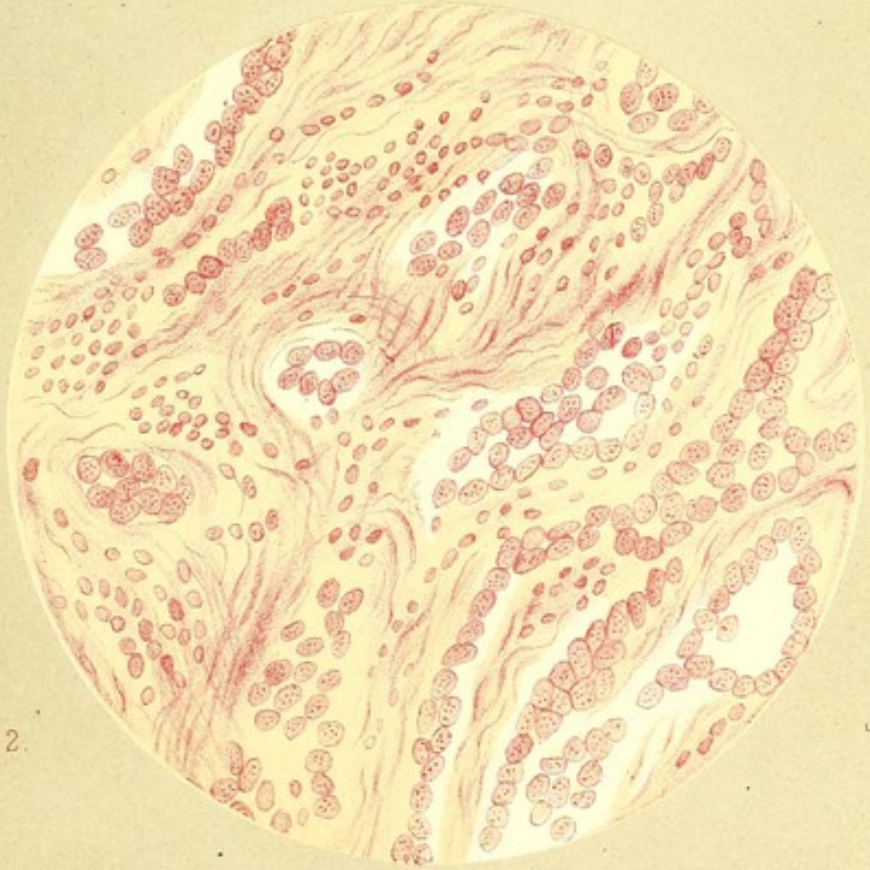

Fig. 2.

1000 in.

C. Berjeau, del. et lith. Waterston & Sons, Edin.r imp.

PLATE XV.

Fig. 1.—Section of a cancer of the breast; the axillary glands being affected.

Fig. 2.—Section of axillary lymphatic gland; the alveolar arrangement of the large cells is seen to obtain. Patient sent from Ramsgate by Dr. Austen.

The following extract bears upon the subject illustrated by this and Plates XIV. and XVI. :—"The linear and alveolar groups of cells in scirrhus, which are always associated with the idea of infiltration, do not arise out of a literal infiltration or wandering of cells into the interstices of the connective-tissue stroma, but the appearance depends on the breaking out, at numerous or successive points in the infected area, of a particular kind of new formation; the pre-existing connective-tissue cells transform themselves into epithelium, and group themselves in alveolar and linear collections. If, then, that alveolar and linear arrangement be not incidental to the parallel arrangement of the matrix cells, but on the other hand a result of the infection, just as the epithelial form of cell is a result of the same, it becomes necessary to search in the primary disease for the pattern of such alveolar or linear grouping, just as one goes to the initially disturbed glandular elements for the epithelial pattern of cell. I shall endeavour to show that the examination of the scirrhus breast affords evidence of such a grouping of the original epithelial cells within the limits of the gland or of the remains of the gland; there is an actual and literal infiltration of epithelium into the abundant connective tissue of the organ, leading to alveolar and linear collections of epithelial cells. The alveolar structure which one *chiefly* sees in scirrhus of the breast is that which is derived from connective-tissue cells. This is the true observation that all pathologists who follow Virchow have made; but it is not the whole truth. There is always in the background a primary diseased centre, a literal infiltration of the original epithelium, and from that focus, however small, the infection has spread to the neighbouring connective tissue, carrying mimicry of structure with it. The difficulty of the case lies in the circumstance that the primary and literal infiltration is inextricably mixed with, and in most cases completely thrown into the shade by, that process in its own likeness which it has conjured up." *

* Creighton, "Infection of Connective Tissue in Scirrhus Cancers."

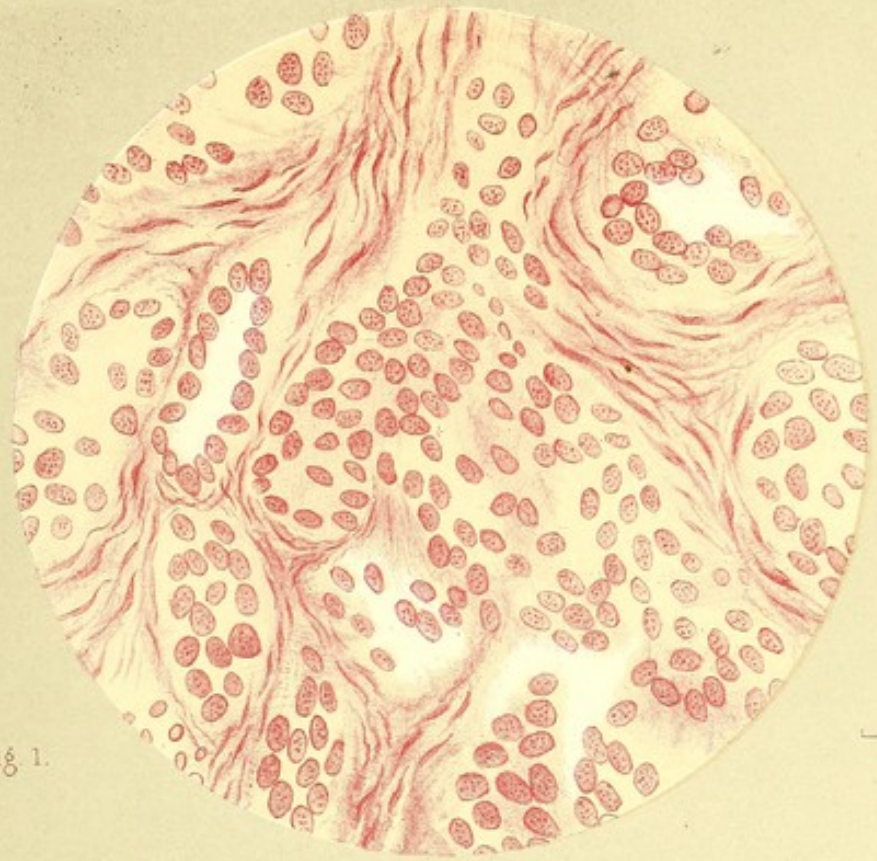

Fig. 1.

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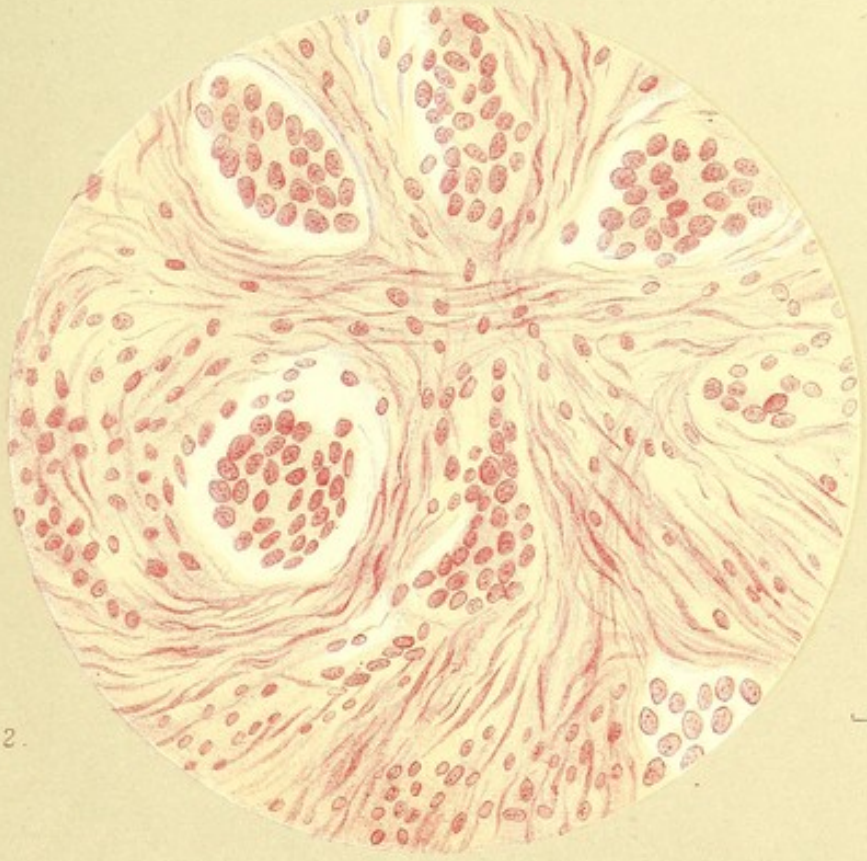

Fig. 2.

1000 in.

C. Bonjean, del. et lith.

Waterston & Sons, Edinr. imp.

PLATE XVI.

Fig. 1.—Section of cancer of the breast in which the axillary glands were affected; sent by Mr. Osman Vincent. The case was one of atrophic cancer; the large cells are seen arranged in alveoli, with a well developed inter-alveolar fibrous matrix.

Fig. 2.—Section of axillary lymphatic gland from the same case. The large cells are arranged in alveoli; lymphatic cells crowd the matrix.

Fig. 1.

1000 in.

Fig. 2.

1000 in.

PLATE XVII.

Fig. 1.—Section of cancerous tubercle of the lung in a case of long standing (nineteen years) cancer of the breast; *vide* page 125,

Fig. 2.—Section of cancer of the breast from the case above named.

Fig. 3.—The same section as in fig. 1, viewed by high power.

Fig. 4.—The same section as in fig. 2, viewed by high power. The alveolar disposition of the large cells sets at rest the question as to the nature of the growth.

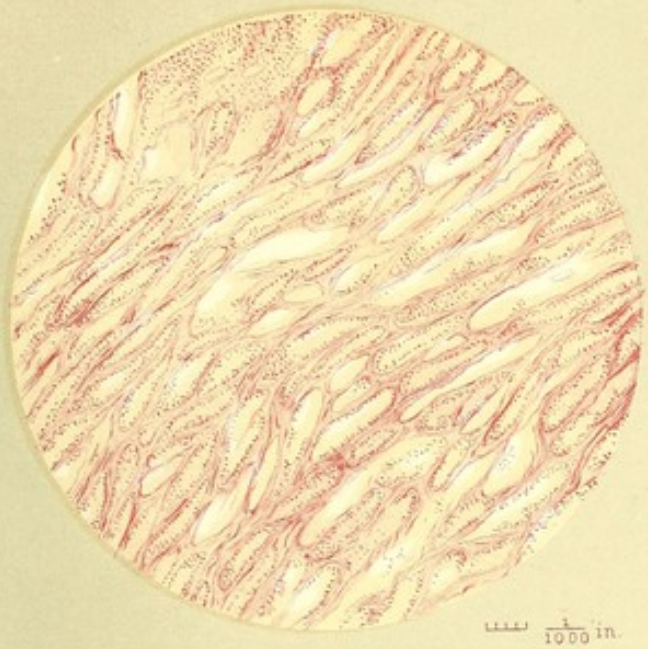

Fig. 1.

Fig. 3.

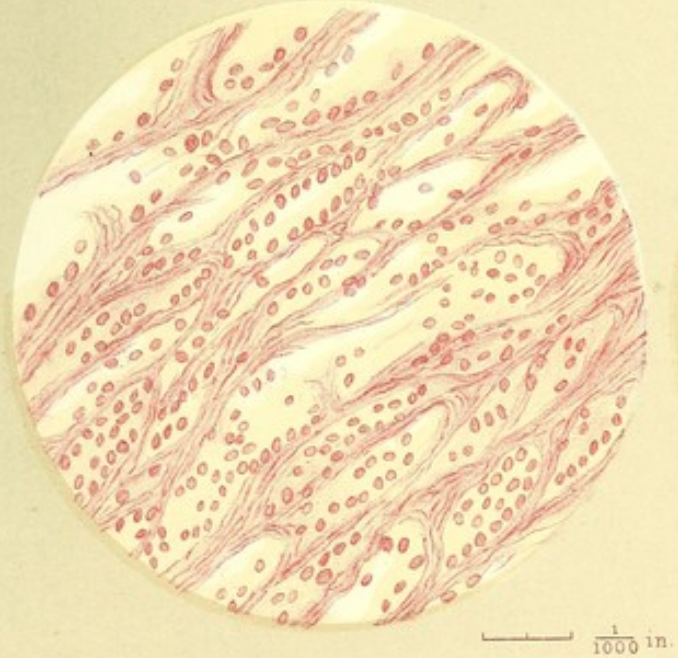

Fig. 2.

Fig. 4.

C. Berjeau, del. et lith. Waterston & Sons, Edin.r imp.r

PLATE XVIII.

Fig. 1.—Section showing the invasion of muscular tissue by cancer, from a case of cancer of the breast, operated on by the late Mr. De Morgan.

Fig. 2.—The same section viewed by high power. The transverse striæ of the muscle-fibres are less distinct than normal; in fact almost obliterated.

Fig. 3—Section showing invasion of adipose tissue by cancer, from the same case.

Fig. 4.—The same section viewed by high power.

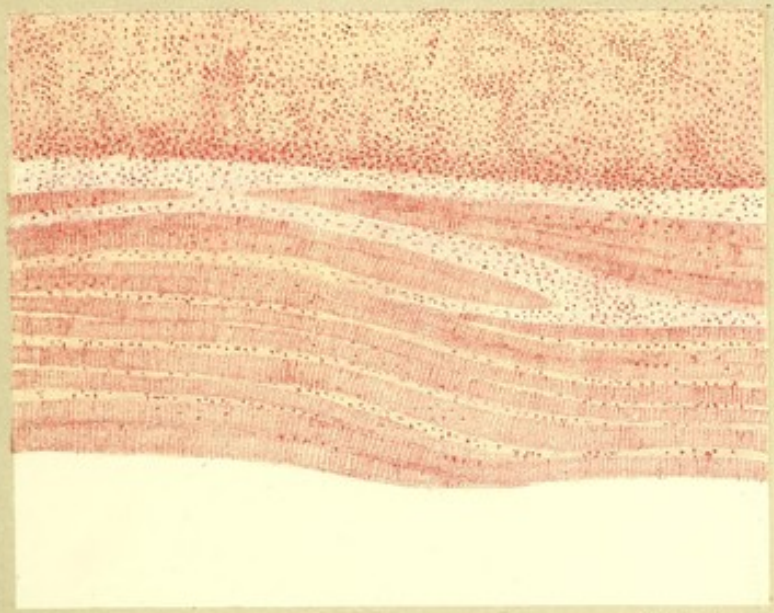

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

C. Berjeau, del. et lith. Waterston & Sons, Edin.r imp.

PLATE XIX.

Fig. 1.—Section of cancer of the pectoral region, from a case of recurrence of cancer after removal of the male breast in a young man, by Mr. Lawson. On the left of the drawing the muscular structure is seen to be invaded by "infiltration" between the fibres; on the right is the simple cancerous growth; below each is a small area viewed by high power.

Fig. 2.—Section of cancer of the breast, removed by Mr. Lawson, in which an unusual disposition of the cells is to be observed, much resembling an adenoma or cystic sarcoma.

Fig. 3.—The same section viewed by high power.

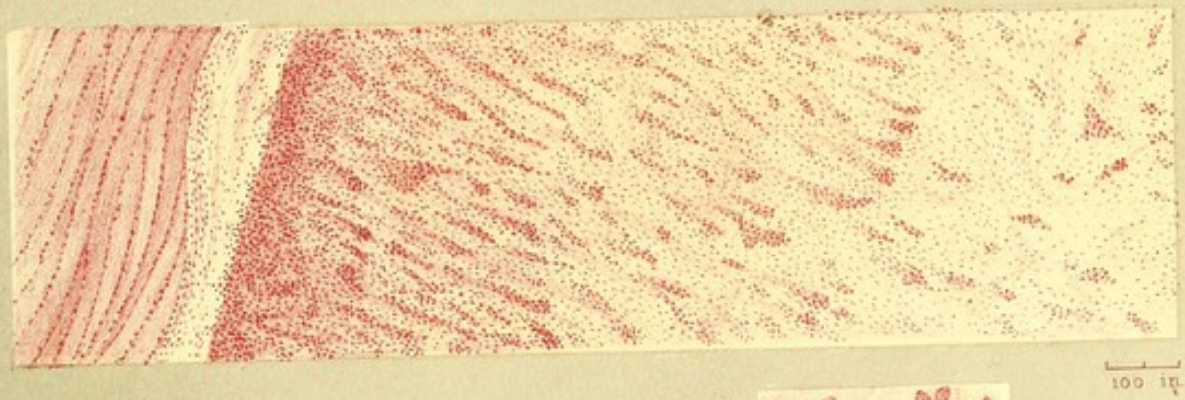

Fig. 1.

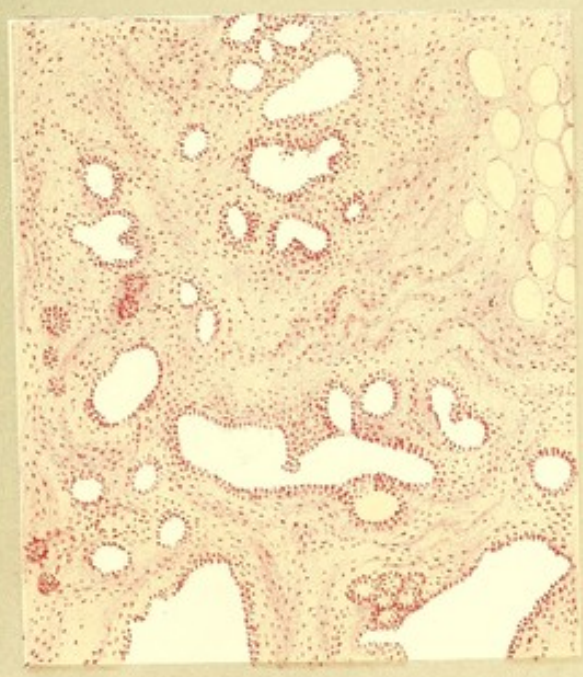

Fig. 2.

Fig. 3.

C. Berjeau, del. et lith.

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PLATE XX.

Fig. 1.—Section from enormous recurrent sarcoma of the thigh, *vide* p. 142.

Fig. 2.—Section from cancer of the rectum ; the arrangement of the large cells not being alveolar, the whole specimen, however, having remarkable resemblance to fig. 3 section from cancer of the male breast.

Fig. 1.

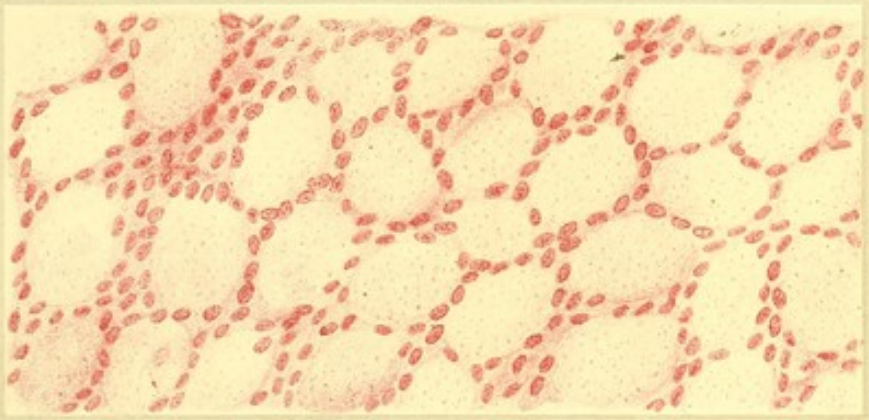

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Fig. 2.

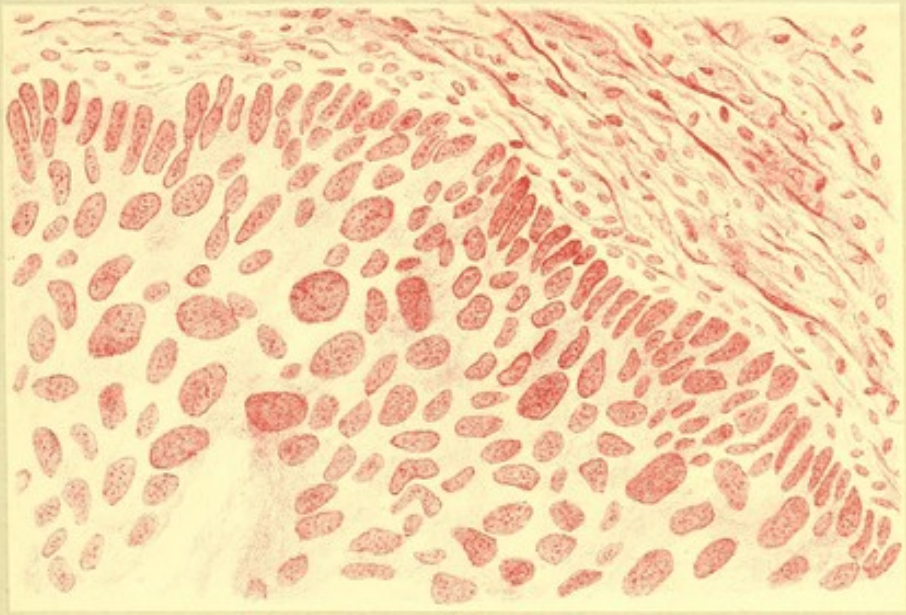

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Fig. 3.

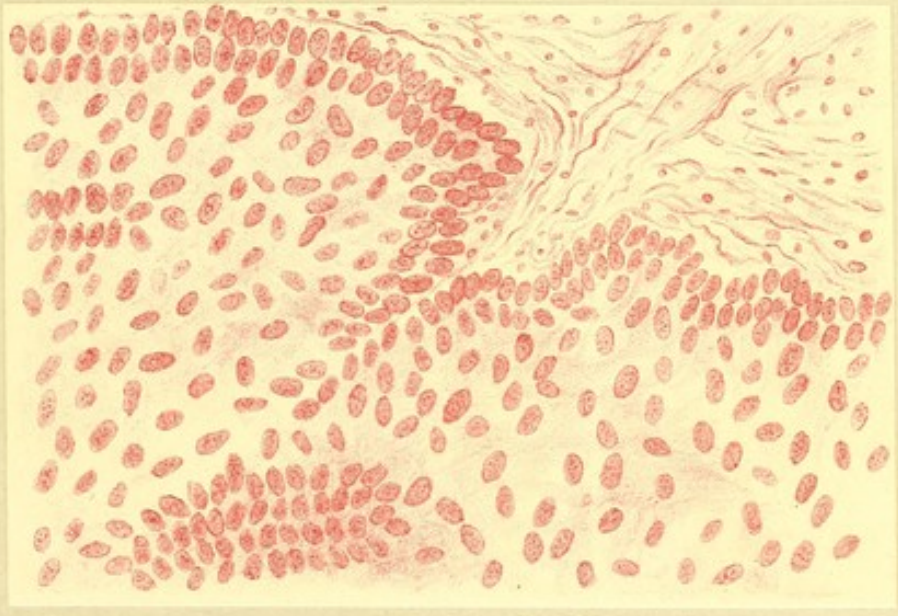

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PLATE XXI.

Fig. 1.—Section through the entire thickness of the lip, showing at figs. 2, 3, 4, and 5 the uniform infiltration of fatty, muscular, follicular, and glandular tissues, with lymphoid cells, viewed by high power.

Fig. 2.
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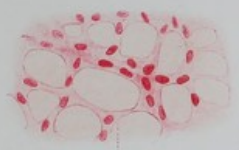

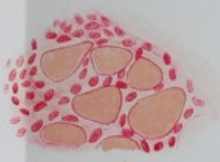

Fig. 3.
1000 IN.

Fig. 1.
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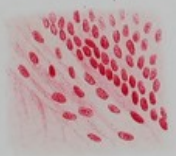

Fig. 4.
1000 IN.

Fig. 5.
1000 IN.

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